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ABSTRACT

This guide provides basic background information about outdoor and environmental education for interested educators. Collected articles summarize current thought, trends, and practices in outdoor and environmental education. Examples of current programs are selected to demonstrate both the variety and excellence of programming in this area. These programs are found in a range of settings, as self-contained units, or as part of a larger curriculum. Articles included define the field of outdoor and environmental education and its place in the school curriculum. Outdoor or environmental education programs are relevant in a variety of curriculum areas. Programs are adaptable for atypical students including the mentally and physically impaired. The guide lists and describes successful practices in use around the United States at the school, district, and regional levels. Outdoor and environmental education programs are equally applicable to rural schools in the west and urban schools in the east. They can also be implemented in grades K-12 across an entire district, or they may involve a residential facility that serves multiple school districts. Appendices include information about programs available nationally. Also included is a small sample of colleges or universities that provide programs for teacher inservice education and staff development in environmental education as well as programs for K-12 students, and a fact sheet describing outdoor education resources and references. (DHP)

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The Center on Evaluation, Development, and Research (CEDR) presents the Exemplary Practice Series. Each volume in the series offers educators information about successful techniques, programs, and ideas concerning a particular aspect of the educational process. Articles and reports contained in the volume are carefully selected by CEDR staff members or guest editors as representative of the best practice(s) in a particular area.

This volume does not represent the "final word" on a topic. Rather, it represents a careful selection of actual practice. There may be other descriptions of practice that were not found. There may be descriptions of new practice available after the volume was published. This volume represents the CEDR staff members' best judgment of available information at this time. We welcome information about exemplary practices that we may have missed and urge you to help us find the best and most up-to-date examples.

One of CEDR's most important missions is to help educators identify ways to solve problems by seeing the successful solutions of others. We sincerely hope that this volume will fulfill that purpose.

The Exemplary Practice Series is prepared
under the direction of
Larry W. Barber, CEDR Director
November 1987

Layout by Dirk Wallace.

INTRODUCTION

Hiking in the woods, collecting leaves, mastering a ropes course, cooking a meal over a campfire, plotting a compass course, and studying about the effects of pollution are all activities that could be found in a curriculum guide for outdoor/environmental education. As a specialty field in education, it has grown out of two distinct movements in American education – the progressive movement and the environmental movement.

Progressive educators argued that education should be experiential and prepare children to become responsible members of society. In response to progressives, schools in the 1920s and 30s developed and sponsored camping programs to provide children with concrete opportunities to learn about their world and to acquire social skills such as cooperation and social planning. During the 1950s, the outdoors became a laboratory for a number of subject areas as students moved outside their classrooms to observe the world of nature. Students learned about natural resources as they studied nature first hand.

Interest in the out-of-doors was heightened by the environmental movement of the 1960s. Concerned citizens warned that the environment was threatened by our failure to protect endangered species and our lack of concern for a range of pollution problems. In 1970, public pressure led to passage of the National Environmental Act. This legislation and similar state laws resulted in the development of materials to teach responsible stewardship of the natural world – a world environmental activists suggest is threatened by increasing demands for recreational use, fuel, and resources. Preparing students to become responsible citizens includes teaching them about the implications of making increased demands on the limited available natural resources.

A number of educators have suggested that the benefits of using the out-of-doors as a classroom extend to the broader educational program. Students have acquired physical strength and confidence as they mastered physical challenges. Others have found the out-of-doors to be a sympathetic therapeutic environment for problem-solving and say that even the most traditional areas of the curriculum – language arts, social studies, and mathematics – can benefit from the stimulation of shared experiences.

We have compiled this volume in order to provide some basic background information about outdoor and/or environmental education for educators interested in incorporating it into their programs. Current thought, trends, and practices in outdoor and/or environmental education have been summarized. Additionally, we have selected examples of current programs to demonstrate both the variety and excellence of programming in this area. The range of settings in which these programs are found – as separate units within a curriculum or as modules of a larger subject or interdisciplinary study – is demonstrated in the chosen articles.

Articles in chapter one have been chosen because they help to define the field of outdoor/environmental education and its place in the school curriculum. Chapter two identifies a range of curriculum areas where outdoor or environmental educational programs are relevant. Their adaptability for atypical students and their potential for interdisciplinary study are suggested. Examples of successful practices in use in many schools around the country are presented in chapter three.

Quality programs exist in a variety of settings – from a single teacher in an individual school to a resident facility with a full-time staff, camp, and program involving thousands of children. Programs at the school, district, and regional residential level are described in chapters four, five, and six. We have tried to demonstrate that outdoor and environmental education programs are equally applicable to rural schools in the west and urban schools in the east. Furthermore, they can be implemented from K-12 across an entire district or involve a residential facility that serves multiple school districts.

The appendixes include information about programs that are available nationally. Many of these programs were developed in schools or districts and have been disseminated nationally. Some are relatively new; others have been successful for a period of time. Also included in the appendixes is a small sample of colleges or universities that provide programs for teacher inservice education and staff development in environmental education as well as programs for K-12 students. Only a few colleges are identified, but most of these provide a valuable resource and should not be overlooked. The final appendix includes a bibliography of references and organizations providing technical assistance or printed information.

We would like to thank our colleagues in the field who responded so well to our call for help, the leaders who provided input and suggestions, and Phi Delta Kappa for recognizing the place these programs can have in our schools. We hope you will find the material in this volume both interesting and useful.

Spencer Sartorius and Robert Briggs, Editors

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63	**A variety of suggestions to integrate the outdoors into the elementary school curriculum are presented.**	Lee, Connie L. "Outdoor Education Activities for Elementary School Students." *Outdoor Education Digest*, March 1984.
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105	**The high school in Lake Forest, Illinois, has developed a highly successful outdoor education program as part of the school physical education curriculum.**	Atwell, Lloyd A. "Outdoor Adventure Education Course." Lake Forest, IL: Lake Forest High School.
117	**An inner-city school in Louisville, Kentucky, is the site of an outdoor program that incorporates a nature center, an environmental classroom, and a garden.**	Hydes, Calvert. "Science Every Minute of the Day." Louisville, KY: Wheatley Elementary School, October 15, 1984.
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205	**Information about several types of educational programs at the Barrier Island Environmental Education Center, John's Island, South Carolina, is presented.**	Barrier Island Environmental Education Center. "A Residential Educational Experience in a Coastal Setting." John's Island, SC: Barrier Island Environmental Education Center, September 1986.
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The What and Why of Outdoor/Environmental Education

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OUTDOOR EDUCATION

OUTDOOR EDUCATION: DEFINITION AND PHILOSOPHY

There is no nationally standardized outdoor education curriculum and no nationally standardized measure of outdoor education competency or knowledge. Outdoor education programs are sponsored by elementary and secondary schools, colleges and universities, youth camps, municipal recreation departments, and private entrepreneurs. They exist in every geographic location and are administered by people of widely varied backgrounds. Elementary school teachers, physical educators, biologists, resource managers, and recreation professionals all work in outdoor education programs and may consider themselves outdoor educators. There is no single body of outdoor professionals in outdoor education because the field transcends school boundaries into recreation departments, youth-serving agencies, conservation organizations, resource management agencies, and many other facets of society. As a result, outdoor education is viewed from different perspectives.

What is a suggested definition of outdoor education?

While there are many definitions of outdoor education, the most comprehensive one seems to be: Outdoor education is education **in**, **about**, and **for** the out of doors. This definition tells **where** the learning takes place, the **topic** to be taught, and the **purpose** of the activity. To people in United Kingdom countries (i.e., Canada, Australia, England, Scotland) and among many Americans, outdoor education refers to recreational activities such as hiking, camping, canoeing, etc. Outdoor education is also referred to as a method or process for extending the curriculum, or a process involving direct learning experiences. Some say it is a place, and other consider it to be a topic. Outdoor education broadly includes programs that may be curriculum-oriented, behavior-oriented, recreation-oriented, conservation-oriented, and/or camping/survival-oriented. In its most inclusive sense, however, outdoor education is education **about** the outdoors and its many ramifications, **in** the outdoors, **for** the purpose of developing knowledge, skills and attitudes concerning the world in which we live.

While simple, this definition can apply to all facets of outdoor education.

Why is "education in, about, and for the outdoors" the most appropriate definition for outdoor education?

This definition tells the place, the topic, and the purpose of outdoor education. **In** tells us that outdoor education can occur in any outdoor setting, from a school yard in an industrial neighborhood to a remote wilderness setting in swamps, meadows, forests, shores, lakes, prairies, deserts, estuaries, and all other biomes. Outdoor education often takes place on a walk around the block, or on a visit to a cemetery, a gravel pit, or an urban renewal project. It can happen on the concrete of a playground, in the weeds of a vacant lot, on the fringe of a sewage treatment plant, at a city zoo, on a forest trail, or in a national park. These kinds of locations are conducive to first-hand experiences, to direct contact with the topic, and to participant interaction and socialization.

About explains that the topic is the outdoors itself and the cultural aspects related to the natural environment. You may teach about mathematics, biology, geology, communication, history, political science, art, physical skills, or endurance, but learning occurs through the context of the outdoors. Soil, water, animals, and plants make up the basic areas of study but students may learn and practice the outdoor activities people pursue during leisure time, or may investigate human alterations of an ecosystem; nevertheless, the educational topic is related to the natural environment. The subject matter of outdoor education is a holistic combination of the interrelationships of all nature and the human being, attitudes for caring for the universe, and skills for utilizing natural resources for human survival and for leisure pursuits. In the broadest terms, the topic is the interrelationship of the human being and the natural resources upon which societies depend, with the goal of stewardship in mind.

Cultural aspects include learning social movements and history through discovering abandoned farms or mills, by analyzing dates and inscriptions on tombstones and identifying the rocks from which they were quarried, or by comparing native plants with those introduced from the Old World as landscape or garden species around old homes.

Students can learn the influence of native people on the land, follow the trails and rivers of explorers and settlers, and develop knowledge and appreciation for cultural heritage as it relates to the land. Culture also includes social issues and decisions that alter or determine utilization of natural resources.

For tells us that the purpose of outdoor education is related to implementing the cognitive, psycho-motor, and affective domains of learning for the sake of the ecosystem itself. It means **understanding, using,** and **appreciating** the natural resources for their perpetuation. **Understanding** means knowledge of the human need for natural resources in ample quantity and quality as the basis of the perpetuation of all societies. **Using** relates to the use of natural resources for food, heat, power, synthetics, technology and leisure pursuits. **Appreciating** refers to the need for humans to look with reverence upon natural systems, upon the aesthetics of nature, and upon their own cultural heritage.

What other terms are used instead of outdoor education and how do they differ in meaning from outdoor education?

Among the terms and their use are the following:

Environmental education refers to education about the total environment, including population growth, pollution, resource use and misuse, urban and rural planning, and modern technology with its demands upon natural resources. Environmental education is all-encompassing, while outdoor education is seen by some to relate to natural resources and not to include the wide sense of the world environment. Many people, however, think of outdoor education in its broadest sense and prefer the term outdoor/environmental education.

Conservation education is the wise use of natural resources. It tends to focus on animals, soil, water, and air as single topics in relation to their utilization for timber, agriculture, hunting, fishing and human consumption. It is not usually concerned with preservation, recreation, or human relations and as such is more narrow than outdoor education. The use of this term has decreased since the 1960s.

Resident outdoor school is the process of taking children to a residential camp during school time for a period of usually 3 to 5 days for the purpose of extending the curriculum through learning in the outdoors. This process was originally called camping education. It was later referred to as school camping, but those phrases were discontinued when parents and taxpayers believed they meant the same thing as the summer camp, which seemed to be more recreational than educational in focus.

Outdoor recreation means a broad spectrum of outdoor activities participated in during leisure time purely for pleasure or some other intrinsic value. Included are hiking, swimming, boating, winter sports, cycling, and camping. In many countries, and to some extent in the United States, these activities are called outdoor education, particularly if they are taught in the school as part of the curriculum.

Outdoor pursuits are generally non-mechanized outdoor recreation activities done in areas remote from the amenities of telephone, emergency help, and urban comforts. To many people, outdoor recreation and outdoor pursuits are similar.

Adventure education refers to activities into which are purposely built elements perceived by the participants as being dangerous. The activities are not inherently dangerous as taught, but appear to be so to the participant and thus they generate a sense of "adventure." Adventure activities include such things as rope courses, white water rafting, mountaineering, and rock climbing (under qualified instruction).

Experiential education refers to learning by doing or experience. Many experiential education activities are synonymous with adventure activities and outdoor pursuits; however, experiential education can also mean any form of pragmatic educational experience. In many ways, outdoor education may be viewed as experiential, especially when the learning takes place through experiences.

Environmental interpretation is a term usually associated with visitor centers administered by national parks or forest service centers. The term refers to a technique used to help visitors understand the meanings of the phenomena on display, while simultaneously whetting the curiosity for more information.

Nature education and **nature recreation** are learning or leisure activities related to natural resources. The terms were used from the 1920s to the 1950s and the activities were not usually interrelated, nor did they focus on the overriding concerns of ecology and stewardship of the land. They were usually isolated individual activities using natural resources for equipment and facilities, and involving knowledge of nature.

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What is a recommended philosophy of outdoor education?

A philosophy is a system of values relative to ways of behaving It includes a set of principles for moral and ethical action A philosophy of outdoor education gives direction for our actions when sponsoring a program Regardless of whether the program is oriented to specific activities such as backpacking or to certain curricular materials such as the sixth grade geography lesson the same set of values can persist When analyzed the philosophy for outdoor education may be based on four premises

1 A prime goal of outdoor education is to teach a commitment to human responsibility for stewardship or care of the land The development of a land ethic that commands us to treat the land and all its resources with respect at all times and on all occasions is the first value for any outdoor education program It is action oriented and attitude-developing It recognizes that whatever is taught in outdoor education must be translated into ethical ecological action

2 Related to the goal of a land ethic or commitment to stewardship must be the belief in the importance of knowing certain facts or concepts The cognitive purpose of outdoor education must be that of the interrelationship of all facets of the ecosystem The interrelationship of natural resources with each other and with humans and their societal customs is the underlying curricular objective The understanding of basic ecological sociological and cultural principles is prerequisite to the commitment to an ethic of land stewardship Concurrently outdoor education does not mandate specific choices in ecological ethics It teaches people how to make choices based on facts It recognizes the difficulty in making choices relative to ecological matters and prepares people to choose carefully after weighing the impact of the action on the environment culture and humanity

3 The third aspect of outdoor education philosophy relates to the perspective of the human being in the outdoor environment We not only need to know the natural environment for the survival of the species we need to know it as a medium through which we spend many hours of leisure Just teaching people about the interrelationships of the resources will not enhance their leisure hours nor save them from the miseries encountered in harsh environmental situations Because we know that humans seek the outdoors for leisure pursuits it is incumbent upon us to teach the recreator how to live comfortably in the outdoors and how to recreate with a minimum impact on the environment The quality of the outdoor recreation experience is directly related to the quantity of the knowledge about the out-of-doors

4 A fourth philosophical belief is that outdoor education is a continual educational experience It is not just one field trip 1 week at outdoor school or even a once-a-year event It must be taught at all levels and pursued throughout life

Where can outdoor education programs be found?

Programs in learning about the outdoors occur at all levels in the educational system although they are most frequently found in elementary schools There may be short or long field trips or fifth and sixth graders may spend 5 days at a resident outdoor school Some schools own and operate gardens, mini farms or wood lots High school curricula may include natural resource oriented programs or programs involving use of the outdoors for leisure pursuits administered through physical education departments

Municipal recreation departments and youth serving agencies include outdoor education in their offerings and membership organizations such as the Audobon Society and National Wildlife Recreation administer 1 day to 2 week programs for youth and adults Many colleges offer outdoor education courses through departments of education or physical education and leisure studies while resource managers sponsor workshops or seminars on natural resource The government through the U S Forest Service National Park Service and other agencies sponsors outdoor education programs for leaders and for youth

Who can profit from outdoor education?

Like most learning outdoor education can be a life-long endeavor All ages abilities socio-economic sectors all people in short can benefit from outdoor education No one can learn all there is to know about the world around them thus there are continual opportunities to enhance outdoor knowledge appreciation and skills Not only does the learner benefit but so does society in general for with increased knowledge there will be increased awareness of the need for an ecological ethic and a chance for an accompanying educated behavior The informed voter and citizen can make a bigger impact on social issues involving natural resources if there has been careful education Outdoor education can encompass many subjects and varied styles of learning Through exposure to environmental awareness techniques the right brained learner can profit Through learning ecological principles the left brained learner can benefit and through combining the two all children can acquire a holistic look at the subject utilizing learning styles of both hemispheres

What are some examples of what people do in outdoor education?

In a progressive manner the following are a few outdoor education activities

—Perceiving nature through the familiar (color shapes patterns lines)
—Using all five senses to become environmentally alert and aware
—Learning ecological principles (e g the sun is the source of all energy) -- and where they are demonstrated
—Studying plants animals soil water air and their interdependence
—Deciphering the history of a pioneer farm
—Solving environmental problems (e g how many people can this stream serve?)
—Debating environmental decisions (e g what is the best use for this property?)
—Practicing minimum impact camping skills
—Preparing to meet basic human survival needs
—Being sensitive to ecological carrying capacity
—Developing self-reliance
—Understanding climate, weather wind chill, and snow structure
—Understanding the impact of the interrelatedness of culture human resources, and natural resources and how a shift in any one of the three can impact on the other two

> A culture based on use of petroleum products depends upon adequate, available fossil fuel controlled by humans who depend upon an oil-based culture or
>
> insect-free agricultural produce is expected by people until they realize other resources are negatively affected by the product used to control the insects or
>
> Modern society depends upon manufacturing which produces acid rain that in turn causes problems to the people demanding the manufactured products

Where can I find more information on definitions, values, philosophies, and history of outdoor education?

Several references are listed Among them the book **Fifty Years of Resident Outdoor Education** -- edited by Dr William Hammerman -- tells much of the history of outdoor education in the United States and of the influence of Lloyd B Sharp Julian Smith William G Vinal and other early leaders The books by Ford and by Smith Carlson Donaldson and Masters also contain information on the history of outdoor education

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EDITORIAL

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Yes, EE Does Have Definition and Structure

HAROLD R. HUNGERFORD, R. BEN PEYTON, and RICHARD J. WILKE

After reading Douglas Nichols' superb editorial on the parameters of outdoor education in the Fall 1982 issue of this journal, we noted the editors' comments at the bottom of page three. Those comments read, "This editorial seemed to succeed quite well in suggesting real parameters for a well known type of educational endeavor. EE is now well over a decade old. Can we define it as well? Do we need to?" Here were those same questions again—years after they should have been laid to rest once and for all!

It is true that a number of years ago EE had no real structure. EE was a term used by educators as a rallying point for a number of specialties. Some of these specialty areas reflected a sincere concern for the environment per se. Some of these specialties used the term "EE" as a means for protecting turf at a time when the areas in question were losing status (or searching for new status) in education. EE seemed to be an up and coming phenomenon, one which would find great acceptance in a variety of formal and nonformal educational circles. This, of course, led to a potpourri of definitions, departures, curricula, and programs. The situation was most certainly chaotic, leading some educators to wish quietly that the term had never been created. But, it had been created and needed to be dealt with.

Through the years, a surprisingly large number of content specialists and educators expended tremendous amounts of effort toward the development of a model that would act as a focal point or, at least, provide some direction for EE. Names like Roth, Naylon, Bowman, Hamann, Podewell, Archibald, McInnis, Bennett, Ross, Cummings, Zeitler, Knapp, Baldwin, Loret, Tanner, Nash, Balzer, Jinks, Stapp, and others appeared in the literature. Although there was great diversity among the definitions and models put forward by these individuals, certain strands appeared and reappeared as their works were

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analyzed. The common strands that appeared in the various definitions and models were synthesized in a rigorous and exhaustive research study completed by Harvey (1) in 1976. The outgrowth of Harvey's research led to a substantive structure for EE. This structure focused on a superordinate goal that called for the development of a homeostatic relationship between man and the environment. In the final analysis, EE develops this homeostatic relationship by teaching human beings those action strategies necessary for resolving value conflicts associated with environmental issues. Although Harvey's work might have led to a consensus among environmental educators, it failed to do so.

Despite the fact that his work lay mostly unattended by professionals, the basic precepts proposed in Harvey's model appeared to be validated by the Tbilisi Intergovernmental Conference Report (3). The well known Tbilisi Declaration proposed a set of five objectives for EE. These objectives were called awareness, knowledge, attitudes, skills, and participation. All of these were, in one way or another, addressed originally by Harvey and by a large number of the writers whose works had been synthesized by Harvey. Still, the Tbilisi objectives were couched in general terms, were poorly operationalized, and did little to resolve the confusion in the ranks of environmental educators.

In an effort to bring increased order to the field and to operationalize the structure of EE, the writers developed and published a set of goals called "Goals for Curriculum Development in Environmental Education" (2). These goals constituted an effort to bring Harvey's work and the Tbilisi objectives into an operational frame of reference—an effort to present a substantive structure which would permit consensus by professionals and the development of curricula which attended to the very real needs of society and the environment.

The Goals for Curriculum Development in Environmental Education focus on four goal levels with attendant subgoals. These goal levels are: 1) ecological foundations, 2) a conceptual awareness of issues and values, 3) an investigation and evaluation of issues, and 4) the training in and application of citizenship action skills. These goals were validated against the Tbilisi objectives. Further, they were submitted to a jury of outstanding educators. This panel consisted of Robert S. Cook, John Disinger, Robert George, Harold McKenna, and R. Thomas Tanner. Following modifications suggested by this distinguished jury, the goals were considered to be valid.

The premises on which the goals are based are sound. The components of the framework reflect the dialogue and trends of contemporary EE. The goals have proved to be functional in the development and analysis of curricula and as a model for research purposes. Further, the curriculum development and research efforts of other contemporary environmental educators are consistent with—if not based on—the substantive structure of EE provided by the goals.

It is disconcerting (to say the least) for those involved in the implementation of EE goals to hear again the question: "What is EE?" It must be just as unsettling for those who are asked to fund or otherwise support our efforts to read that, after a decade, the professional journal of EE is still looking for an operational definition of the field.

We submit that EE does have a substantive structure that has evolved through the considerable efforts of many and that the framework has been documented formally in the literature. The question asked in *The Journal of Environmental Education* in the fall of 1982 most certainly has been answered. One would dare hope that this question could, at long last, be laid to rest. No doubt, it would behoove the EE community to keep a critical eye on its goals and to reassess them as necessary, but the field is quite definitely beyond the goal setting stage and into the business of goal implementation.

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In Praise of Environmental Education

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Environmental education is as old as the hills and as fresh as tomorrow's sunrise.

MIRIAM S. WETZEL

When I was a freckle-faced third grader in a one-room schoolhouse, the teacher, Mrs. Van Ormer, succumbed to our pleading three or four times a year and took us for a hike through the Pennsylvania hills. She shared her knowledge of the local flora and fauna and even taught us the Indian trick of moving through the forest leaving no sign that we had been there. Our motivation was to get out of schoolwork for a day, but after our time with Mrs. Van Ormer, we never again carelessly plucked a sprig of wild arbutus or uprooted a lady slipper.

Environmental Education Then and Now

That was environmental education. So are the well-organized programs being conducted in established environmental education facilities from Maine to California, and so are the many types of day trips and overnight experiences planned and carried out by individual schools. All are cases of experiential learning which has as one of its most important aspects getting out of the classroom and away from the ordinary school setting with its ordinary behaviors.

Environmental education goes back more than 50 years when it was started by the Kellogg Foundation in Battle Creek, Michigan. In the 60s, the National Park Service, interested in promoting environmental education, set up National Environmental Study Areas where school children went to learn about their surroundings, and the National Environmental Education Development program *was* a successful federal entitlement program—unfortunately, it suffered from the 1981 federal budget reorganization. Despite the budget cuts and little recognition in educational journals, though, environmental education continues to thrive quietly, like a hardy violet on the moss-covered forest floor.

The merits of environmental education are well-documented and need only brief mention here. All schools are located in an environment, and enhanced awareness of this environment, its unique plant and animal life, its fragility, and the delicate interdependence between humankind and the planet Earth are worthy of study. Plant and animal life exist even in large cities, but a subway or bus ride to the edge of urbanization affords access to much more, and the best experience, a camp or wilderness setting, abounds in natural habitats and ecosystems for study.

In the past, environmental education has been touted as an excellent way to teach the "basics." While it is true that all of these skills are involved in environmental study, I suspect that this argument has been oversold to parents and school boards. Environmental education needs no excuses. It stands on its own as a worthy component of the school curriculum.

John Santos, director of Nature's Classroom, a prototypic environmental education program with sites in three New England states, says, "The aim is basic literacy in the environment—to get kids to the place where they ques-

Photo: Miriam S. Wetzel

Miriam S. Wetzel is a graduate student, The University of Pennsylvania, Philadelphia.

Figure 1. Budget for Two-Day Educational Environmental Camping Experience.

Expenditures:	
Campsite Rental	$ 300
Food ($5 per individual: 180 campers, 40 staff)	1,100
Insurance ($1 per camper by special arrangement with local insurance company)	180
Two training sessions by Chewonki Foundation staff	150
Nurses' supplies	30
Books, recreation supplies, and equipment	90
	$1,850

Income:	
Fees $4 per student (5 meals)	$ 720
From student Activity Account	300
School Board support from special funds	830
	$1,850

tion." The justification for getting children out of the classroom is their enhanced ability to learn when they go back in. In addition to teaching about our natural surroundings, environmental education has the potential to increase other cognitive learning and social development. Increased positive self-image, trust, and group cohesiveness are valuable outcomes of a well-run environmental education program. After a week at Nature's Classroom, one teacher wrote:

> What a change in the kids after the week we spent with you. They have always worked well as a group, but now they are truly amazing! The petty battles and quarrels have almost disappeared—all the kids seem to take more responsibility for themselves and the group.

What About Cost?

The best of all possible worlds is to have some funds allocated in the school budget. A laughable idea in the face of cutbacks? Not necessarily. It just means that principals and administrators have to do their homework before budget time and convince the superintendent, school board, and community that it is, indeed, a cost-effective component of the educational program.

Environmental education has to do with understanding and preserving the natural world, learning to use resources wisely, and living in harmony with nature and one's fellow human beings. It requires no expensive textbooks, no extensive equipment, and no additional staff. Costs vary according to the type of program, ranging from $75 to $100 per pupil for a week-long residential program, to as little as $10.50 per student, which was the cost of our homegrown two-day program.

A good portion of the outlay in our low-cost program went for food. Parents can see the logic in paying a fee to cover food costs because they would have those if the child were home. Diligent searching can locate funds from private business and foundations. Nature's Classroom encourages parents to help their children earn a realistic part of the money themselves. Bake sales and car washes should be a last resort because they can become burdensome to school and community alike. If the commitment to environmental education is strong and plans are made far enough ahead, the money can be found.

There is a cost in time to be considered also. Centers such as Nature's Classroom in Massachusetts, New Hampshire, and Connecticut, and the Chewonki Foundation in Wiscassett, Maine, offer well-planned programs with a minimum investment of preparation time on the part of school personnel. For our two-day program, teachers volunteered to spend the overnight time and to attend two after-school training sessions, but schools should not take voluntary participation for granted.

With time and cost as the primary factors determining a school's involvement in environmental education, the main options are:

1. A residential program at an established site, usually of one week's duration
2. An individually designed and implemented program, two days to one week.

Sources of Information

A residential program is definitely the best way to go; it's well worth the modest cost per student. In New England, information about such programs is available in *A Resource Guide to Out-Door Environmental Education in New England*, published by the Massachusetts Environmental Education Society, 15 State St., Boston, MA 02109. In other parts of the country, contact the nearest Environmental Protection Agency or write for *The Conservation Directory* from the National Wildlife Federation, 1412 16th St., NW, Washington, DC 20036. This directory not only contains additional information about national use and management of environmental resources, but also provides local contacts that are useful for planning an environmental education project. The listings in ERIC under Environmental Education and Outdoor Education provide additional references.

Two-Day Program: A Way to Start

For 180 sixth graders in our school in Windham, Maine, we chose the intermediate route—a two-day, do-it-yourself program. My personal experiences with environmental education—one-room schoolhouse style—had long since faded when a sixth grade teacher proposed our program. Initially, we grappled with the usual cliches: the school board won't go for it, the parents won't go for it, it will cost too much; but all our fears were laid to rest. What could have been our only obstacle, reluctance on the part of the sixth grade teaching staff, proved nonexistent. They endorsed the idea wholeheartedly and everything else fell into place. We designed an estimated budget (see Figure 1) and went to the school board. Because of a successful week-long experience by two sixth grade classes at Chewonki Foundation two years earlier, the board endorsed the proposal and provided funding. With this and the use of a local Boy Scout camp in return for a $300 donation, we were able to keep the cost to parents at $4.

An essential part of our preparation, however, was two four-hour sessions for all teachers and volunteer staff with professional trainers from the Chewonki Foundation. To justify the time spent out of the classroom by the students, we made a firm commitment to design a sound educational program and found this list of books and journals helpful in preparing lesson plans and activities:

Fluegelman, A., ed. *The New Games Book*. New Games Foundation. New York: Doubleday, 1976.

Gross, P., and Railton, E. *Teaching Science in an Outdoor Environment*. Berkeley: University of California Press, 1972.

Santos, J. *And This Our Life*, Vol. I and II, available from Nature's Classroom, Maple Rock Farm, RFD #1, Southbridge, MA 01550.

Van Matre, S. *Sunship Earth*, American Camping Association, Bradford Woods, Marlensville, IN 46151.

Journal of Environmental Education, 4000 Albemarle St., NW, Washington, DC 20016.

Journal of Outdoor Education, Northern Illinois University, Department of Outdoor Teacher Education, Taft Field Campus, Box 299, Oregon, IL 61061.

Four books on environmental studies in urban schools, developed by and for teachers through an ESEA Title III grant, may be obtained from: McDonough 15 School, 721 St. Peter St., New Orleans, LA 70116. Titles are: *Crawfish; Doodlebugs; Recycling Aluminum; Catching Insects*. A book on taking urban classes camping in state parks, available from the same source, is *Big and Small Are Camping Again* by Carol Brown and Jackie McCorkle. The *Journal of Environmental Education* 13,2 (Winter 1981–82) contains an annotated bibliography that is a gold mine of environmental and outdoor education reference sources.

Safety First, Last, and Always

We take tremendous responsibility any time the welfare of children is in our hands, whether in the schoolyard or the wilderness. The seriousness of this responsibility should cause us to plan carefully but should not freeze us into immobility. Environmental education in all its variations has tremendous learning potential for students and teachers alike.☐

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Outdoor Education in the Total Curriculum

Frederick A. Staley

Outdoor education uses the outdoors in an environmentally appropriate manner to enrich the lives and learning of individuals. In school settings, outdoor education is not a separate discipline with its own prescribed objectives. Rather, its processes and methods use the abundant natural, community, and human resources outside the traditional classroom for first-hand learning.

Outdoor Education Is Not a Fad

As a process and methodology, outdoor education has probably always been important to education and has persisted over the last 50 years, despite dramatic changes in technology, society and education. Outdoor education continues to experience popularity for several reasons.

1. The processes and methods of outdoor education are consistent with the best of what is known about how individuals learn. Smith and others[1] identified eight distinguishing characteristics of outdoor education: emphasis on direct experience; discovery, exploration and adventure; sensory learning; activities natural to childhood and youth; intense interest; reality; problems in context; and active learners.
2. Many societal needs that outdoor education helped meet in the 1930s and 40s remain significant concerns: deterioriation of the environment, population growth and urbanization, the frenzied tempo of modern living, mechanization, automation, computerization and changes in the nature and extent of work and leisure.
3. Current interests in total health through proper diet and exercise, concerns about energy depletion and world ecology, and loss of individual identity, the need for adventure in otherwise routine lives and our remoteness from nature are features of present society being addressed by many outdoor education programs.

Scope of Outdoor Education

Outdoor education programs exist at every level and type of school and their methodology has been used with every type of student (gifted, handicapped, delinquent, and "normal") in every type of community (inner city, suburban, rural, and ethnic specific).

The resources used in outdoor programming range from the school site and local community to nature centers, museums, and monuments away from the school neighborhood. According to a recent study supported by the Council on Outdoor Education, 12.3% of the 1,169 schools surveyed in the United States also own and operate their own residential outdoor education center, farm, ranch or forest.[2] Twenty-five percent of *all* schools, however, engage in some type of residential outdoor education program, typically spending two or three days in residence. Residential programs are recorded at every grade level, and there appears to be a rather high percentage of special education students engaged in these programs.

School and district outdoor education programs generally are subject to local guidelines and policies. Thus, as

Educational Goals and Outdoor Education Means

Educational Goals[3]	*Outdoor Education Means*
1. To develop students' awareness, knowledge, appreciation, and respect for the environment and their relationship to it	*1. through opportunities to study and live in the outdoors and become part of the interrelationships existing between people, plants, animals, and the physical environment.*
2. To develop students' understandings, skills and appreciations needed to mentally, emotionally, physically, socially, and spiritually lead productive, creative and enjoyable lives	*2. through exposure to new environments and experiences which lead to greater self-understanding and the opportunity to become involved in activities and modes of expression that tap the total human potential.*
3. To develop students' skills and motivation to learn how to learn (i.e., how to find problems, solve problems, and make decisions)	*3. through active participation in the identification and solving of environmental problems in the community.*
4. To develop students' ability to evaluate and improve their concepts of personal achievement and self-worth	*4. through achieving success and accomplishments in meaningful and challenging adventure activities.*
5. To develop students' skills and understandings required to work and learn cooperatively with others	*5. through group living experiences, particularly in resident outdoor education.*
6. To develop students' lifelong outdoor and environmental interests, attitudes, and skills	*6. through exposure to such activities as hiking, birdwatching, orienteering, nature crafts, creative writing, and archery.*

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an integral part of the curriculum, the regulations for health, safety, finance, travel, supervision, and liability usually apply to the outdoor education program. The Council on Outdoor Education study found, however, that the costs of resident programs seem to be shared equally by schools and parents and that the average daily cost per pupil for resident programs was approximately $20. in 1979.

Outdoor Education's Contribution to Educational Goals

Outdoor education has the potential to contribute to most of the school's general educational goals through its special processes and methods.

Outdoor education methods and processes have also helped achieve more specific goals. Both the Battle Creek, Michigan, and Houston, Texas, schools for instance, have used residential outdoor schools to achieve racial harmony. Schools in Mesa, Arizona have mandated a desert survival unit. Specific goals relating to improving self-concept, mainstreaming special students, vocational education, and back to basics skills have been at the heart of many other programs.

Varying Emphasis of Outdoor Education Programs

Actual outdoor education programs vary widely. Most commonly, programs use the outdoors for curricular enrichment and integration. According to the Council on Outdoor Education study cited earlier, the top ten disciplines most often using outdoor education methods in an integrated fashion are general science, biology, physical education, ecology, art, geology, mathematics, geography, history, and music.

An activity or adventure focus is a second major approach. While the skills, attitudes and appreciations necessary to intelligently perform outdoor activities such as archery, hiking, camping, swimming, backpacking, canoeing, shooting, cross-country skiing, ropes course and rock climbing are often part of physical education, they have significance for many other curriculum areas as well.

A third major focus for outdoor education programs is environmental education. Such programs could feature pollution detection and monitoring, environmental and ecological awareness and environmental problem-solving.[4] Environmental approaches generally are parts of science, social studies or interdisciplinary studies, but they can function within the physical education curriculum as well.

Children discover a crayfish in a streambed, which leads to questions about the nature of the crustacean and its place in the environment.

Photo: Frederick A. Staley

Other outdoor education approaches categorized by Knapp and Goodman[4] include: (1) *The problem-solving approach.* This goes beyond environmental problem-solving to focus on *processes* of solving problems. Knapp and Goodman give an example: "What can be learned about the lives of people who lived in an area and about oneself from the evidence found in a cemetery?" The question requires problem-solving skills drawn from many disciplines. (2) *Natural history and identification.* The focus here is on learning names and characteristics of plants, animals, rocks, and minerals and is a modern version of the nature study movement of the early 20th century. (3) *Personal growth through outdoor experiences.* Values issues, outdoor, and interpersonal encounters are vehicles for self-understanding and personal growth. In actual practice many outdoor education programs combine these possible foci, particularly at the elementary level.

An interdisciplinary approach which brings learners and rich outdoor resources together to help achieve general and specific educational goals, outdoor education also responds to many of the needs to help individuals live richer and more creative lives.

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Evaluation and Accountability

Cindi Baker

While program accountability did not receive a great deal of attention in the 1950s and 1960s, the 1970s witnessed the beginning of a downhill slide in educational tax bases and federal funding, which was reflected in tax initiatives. In addition, student achievement scores in language arts and mathematics began to decline at an alarming rate. Thus, communities and school boards have been examining school curriculum, teaching methodologies, and staffing in their schools. The "back-to-basics" movement and the advent of computer technology have increased the need for hands-on-learning in an experiential setting, but have decreased the opportunity to include these experiences during the academic year. Increased scrutiny of *nonbasic* programs has served to eliminate many quality programs vital to the child's total education. Outdoor and environmental education programs have become victims of this phenomenon. This article identifies an accountability model to help educators plan, evaluate, market, and follow-up an outdoor education program.

Program Development and Survival

The development and maintenance of outdoor education programming increasingly depends on educators' ability to convince decision-makers. All programs in an educational entity, including outdoor education programs, should reflect an institution's goals and objectives. To overstress the uniqueness of outdoor education programs can be misunderstood as "nice, but not necessary."

Many outdoor educators find themselves so busy developing and operating their programs that they neglect planning, evaluating, marketing, and following-up. Program changes may be needed but there may be nothing in writing to substantiate perceptions. Nor can one expand and fund programs without documenting student participation, experiences, and growth. Although educators in other disciplines have a variety of established evaluation instruments, those for outdoor education must be individually designed so that they truly evaluate the program.

These six accountability steps can help educators develop their own evaluation design for outdoor education programs.

Steps to Accountability

The following steps are presented to guide developing an evaluation design for your program. The discussion includes specific examples from the evaluation design used for the residential outdoor education program for fifth grade students in the Houston, Texas, Independent School District. Outdoor educators may examine these examples in relation to their academic environment. Accountability steps include (1) needs assessment; (2) prioritize goals from assessment data; (3) develop program goals; (4) develop measurable program objectives; (5) develop specific instructional activity objectives; and (6) plan an evaluation.

Step 1—Needs Assessment

To develop, maintain, or expand outdoor education programs, one must assess the value of such programs to students, parents, and other educators. If the outdoor educator is the sole program proponent in the system, chances are high that the program will continue to require that the educators donate personal time and that students pay their own expenses.

To construct a needs assessment instrument, it is wise to solicit the assistance of those with greater program evaluation expertise. These individuals can develop a tool appropriate for the target audience, which in turn will provide valuable information to assist in developing program goals. A survey instrument using the Likert method provides a range of responses and is recommended.

Step 2—Prioritize Goals

From the needs assessment data prioritize the program goals. The instrument should provide data on the respondent's perceptions of outdoor recreation skills, knowledge of the natural environment, experiential learning outside the classroom, and the interrelationships of these concepts with district academic goals. If academic achievement is the audience's top priority, the program should reflect this need. The goals identified through a needs assessment might include:

I. Basic Skills
II Environmental Awareness
III. Outdoor Recreation Skills

Step 3—Develop Goal Statements

Program goals should strengthen the relationship of outdoor education to the curriculum. Goals should support the priorities established by the needs assessment. Using the goals

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stated above as priorities, the following statements could be made.

I. To be an outdoor extension of basic skills classroom instruction

II To promote and foster a concern for the environment

III To develop outdoor recreation skills as part of developing a healthy lifestyle

Step 4—Develop Measurable Objectives

It is not necessary to develop objectives in excessive numbers. Three to five well-developed and measurable objectives will suffice. Many elements of outdoor education deal with the affective experiences of adventure, risk-taking, and observation of beauty. Affective evaluation can be a stumbling block but effective elements can be assessed by documenting the type and number of experiences in which students participate. *For example: Students will participate in a minimum of 15 multisensory experiences during the outdoor education program.*

Changing the attitude of people toward their environment is one of our greatest challenges. A pre- and post-survey instrument (designed for the appropriate reading level), can measure attitude change. With more than 100 students, a random sampling process can be used. *For example: Seven randomly selected student groups participating in the outdoor education program will collectively express improved attitudes toward environmental concerns. (Improved attitude is defined as a statistically significant gain at the .05 level of significance.)*

Even though this type of measurement may appear too sophisticated, it is readily adaptable to any written assessment instrument and provides significant results to illustrate to administrators, school boards, university curriculum committees, or parents the program's positive effects. Individuals responsible for interpreting student achievement data can be very helpful in the use of statistical analyses.

Step 5—Activity Objectives

Program instruction and evaluation are closely intertwined. Without being accused of only "teaching to the test," it is important to correlate instructional activity objectives with the skills and knowledge that will be evaluated. The following statement from the *Houston Independent School District's Curriculum Guide for Physical Education for Grades Four, Five, and Six* correlates outdoor education objectives with fifth grade physical education.

> Activities should permit all pupils to participate and achieve some measure of success in:
> Physical fitness
> Body mechanics
> Game and motor skills
> Knowledge of activities
> Emotional and social growth.

The "Canoe Obstacle Course" is an instructional activity at the Outdoor Education Center used to develop game and motor skills, knowledge of the activity, and social growth through working with a partner.

In another example dealing with basic skills, the outdoor education program develops activities in mathematics using the district's *Mathematics Correlation for Grade 5*. One of the correlation's objectives is to identify lines of symmetry. A lesson plan studying symmetry in natural architecture supports this objective.

Step 6—Evaluation Plan

Evaluation processes to be sure that students have accomplished the objectives can involve a variety of methods.

1. Document the number of students that participate and the lengths of their activities, i.e., after school, weekends.
2. Document the number of experiences on a daily schedule or weekly plan.
3. Assess cognitive learning and attitude change using a pre- and post-test. Environmental vocabulary may need to be reworded at the elementary level.
4. Administer outdoor skills tests and establish ranges of performance.
5. Survey parents, other classroom teachers, and administrators.
6. Collect response letters from students and parents.

	Strongly Agree	Agree	Disagree	Strongly Disagree	No Opinion
1. Outdoor recreational skills are important in a child's education.	☐	☐	☐	☐	☐
2. Environmental education can help develop the basic skills of reading and mathematics.	☐	☐	☐	☐	☐
3. Students already know all about their environment and conservation.	☐	☐	☐	☐	☐

Figure. Survey Instrument

One should develop instructional activities designed to meet every measurable program objective and an evaluation plan for it. Analysis of the data enables one to determine if each objective was met. If any were not met, an explanation as to why the objective was not achieved can provide a solid foundation for change during the next year.

The accountability steps presented in this discussion should help outdoor educators to meet most objectives. This model also should generate sufficient data to substantiate the need and value of the program. Once a model that meets specific program needs is developed, the accountability process becomes less threatening and can be perceived as a positive assessment tool to examine and promote outdoor education.

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Across the Curriculum

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OUTDOOR EDUCATION

DIGEST 1984

OUTDOOR EDUCATION FOR BEHAVIOR DISORDERED STUDENTS

Outdoor education offers special benefits to behavior disordered students. Programs range from simple, near-school activities to lengthy, more expensive wilderness camping experiences. In either case, positive behavioral changes among behavior disordered students have been reported. A review of possible programs/activities and possible benefits is a step in the direction of offering new opportunities to these students.

What is outdoor education?

Outdoor education is a means of curriculum enrichment, whereby the process of learning takes place out of doors. Outdoor education broadly includes environmental education, conservation education, adventure education, school camping, wilderness therapy, and some aspects of outdoor recreation. Among the curricular areas often associated with outdoor education are language arts, social studies, mathematics, science, nature study, and music. Self-concept enhancement is approached through outdoor physical stress situations and opportunities for leadership development.

Outdoor education enables students and teachers to interact in an environment free from the limitations of the classroom. For behavior disordered students, the change in environment can facilitate learning by removing them from the classroom setting which they may already identify with failure.

What are the characteristics of behavior disordered students?

The federal government, in Public Law 94-142, defines a behavior disorder or serious emotional disturbance as follows:

> "...a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree, which adversely affects educational performance:
>
> A) An inability to learn which cannot be explained by intellectual, sensory, or health factors;
>
> B) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers;
>
> C) Inappropriate types of behavior or feelings under normal circumstances;
>
> D) A general pervasive mood of unhappiness or depression; or
>
> E) A tendency to develop physical symptoms or fears associated with personal or school problems.
>
> The term includes children who are schizophrenic or autistic. The term does not include children who are socially maladjusted, unless it is determined that they are seriously emotionally disturbed."

There are many different terms used to describe behavior disordered students. Those used most frequently in the literature include emotionally disturbed, disruptive, aggressive, emotionally handicapped or conduct disordered. Such students are frequently said to have "behavior problems."

Behaviors that characterize behavior disordered students and lead to referral for services include defiance, uncooperativeness, shyness, withdrawal, passiveness, self-consciousness, fearfulness, and anxiety, to name a few. The degree of severity and the duration of these and other behaviors may vary from student to student.

What effects can outdoor education have on behavior disordered students?

Research done on outdoor education programs for behavior disordered students yields a number of positive findings. Among these are improvement in self-concept, social adjustment, academic achievement, and group cohesion. Relationships with peers, parents, teachers, and counselors were also improved in some of the programs. Teachers also reported greater ability to teach specific skills and academic behaviors, and to lessen disruptive behavior when programs were conducted out of doors.

Reports from individual programs show promising results in the application of outdoor education principles in teaching behavior disordered youth. Lane et al. (1983) found increases in peer relationships and group cohesion in their counseling-oriented "Group Walk-Talk" program, which combined hiking and counseling in a public school program for adolescents.

Residential programs that use wilderness camping have also reported success. An evaluation of the Eckard Foundation (Griffen, 1981), a residential therapeutic camping program, revealed significant improvement in self-concept, personality adjustment, and academic skill level. Rigothi (1974) reported favorable student and teacher evaluation of student adjustment and academic achievement in a similiar program for secondary students with emotional and drug-related problems in New York State.

Non-residential programs also have reported success with behavior disordered students. Burdsal and Force (1983) examined counselor ratings of youth involved in three two-week wilderness expeditions. The results show that boys are perceived as becoming more self-reliant and as increasing in involvement with the therapeutic process. No significant changes were reported for girls. A study of a Dallas, Texas, program specifically for girls (Neff, 1973), called Girl's Adventure Trails, revealed statistically significant changes in the student attitude scale and academic motivation measures. Girls who participated in the 26-day wilderness camping program, which featured individual and group counseling, attained a positive attitude towards themselves, parents, and teachers.

Hobbs and Radka (1975) studied behavior change during a short-term (five-day) therapeutic camping program. Operant techniques were used to modify verbal behaviors of adolescent boys during group therapy sessions. Besides having success with modifying verbal behaviors, the authors also reported that the group became more close-knit and generally worked together on camp problems.

Possible methodological shortcomings must be taken into consideration when evaluating the results of many outdoor education studies. Byers (1979) mentions that a common problem in many studies is the lack of a control group. To correct other problems with research Byers recommends documentation of the actual content of camping programs. Also, short-term outcomes in terms of changes in camper behavior must be assessed along with the relationship between the camp program and these changes. Finally, the long-term outcomes concerning community adjustment of the campers must be evaluated.

What types of programs and activities can be used with behavior disordered students?

Currently in existence are many types of programs that utilize the out-of-doors in treating behavior disordered children. Many are long-term residential camps that offer wilderness camping as therapy, while others are wilderness camping programs of shorter duration. The latter include summer programs, month-long programs, and day camps. Another type of program is the public school class that integrates outdoor education into the curriculum areas or combines the academic programs with high-adventure programming.

Behavior-disordered students benefit from activities that offer a challenge to the students. Camping, hiking, rock climbing, rappelling, canoeing, rafting, and backpacking are all activities that can be adapted to the novice and do not require exceptional physical ability. A patient and knowledgeable instructor can make these high-adventure activities success experiences for the behavior disordered student. Other activities that benefit students include ropes courses, initiative games, cross-country skiing, snowshoeing, orienteering, cycling, skin diving, tubing, and sailing.

Although not all schools can provide these activities, there are near-school activities which are also valuable. Field trips that emphasize nature study, environmental education, conservation of natural resources, awareness of the outside world, local history, community services, nutrition, physical education, and health education can also be learning experiences for behavior disordered students.

Where can more information concerning outdoor education for behavior disordered students be obtained?

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The Group Walk-Talk:

A Therapeutic Challenge for Secondary Students with Social/Emotional Problems

Bruce Lane
John Bonic
Nancy Wallgren-Bonic

■ Good teachers constantly look for ways to get the best out of their students. Unfortunately, many students (particularly those with social/emotional problems) have the knack for "getting the best of" their teachers. When nothing seems to be working, it is a natural response to want to tell the whole class to "take a walk!" For staff at the Grundy (Illinois) Alternative School, a carefully constructed group Walk-Talk activity was used as a positive therapeutic and recreational tool for working with secondary level students with emotional and behavior disorders.

ORIGINS OF THE WALK-TALK

Therapeutic camping programs and other outdoor stress-challenge activities have been recognized as providing ex-

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The group Walk-Talk is an important link to academic learning and social/emotional growth. *[Photos by Nancy Wallgren-Bonic (lower) and John Bonic (upper)]*

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cellent environments for the development of positive group interactions and self-awareness (Osborn & Boeve, 1979; Rickard, Serum, & Forehand, 1975). The value of such activities in working with students who have social, emotional, or behavioral problems has been explored in numerous articles, studies, and texts (Byers, 1979; Brinkman, 1978; Griffin, 1981; Metcalfe, 1976; Osborn & Boeve, 1979). Therapeutic camping programs such as Outward Bound, Darrow Hall, and Touch of Nature Underway have long-standing reputations for providing excellent opportunities for growth.

While the therapeutic benefits of these outdoor activities have been widely recognized, their restrictive characteristics are often overlooked, and these greatly limit the accessibility of stress-challenge activities for the average public school special education program. These characteristics include:

- *Scheduling.* Most outdoor stress activities are best suited for late spring, summer, or early fall, while most special education programs operate during the fall, winter, and spring. Support for summer programs is difficult to obtain, and likely to become even more difficult in the future.
- *Location.* The typical site is an outdoor area some distance from the school. Thus, activities cannot be conveniently worked into the daily school schedule. Transportation expenses and the need for extra staff time in order to conduct activities during out-of-school hours pose additional difficulties.
- *Equipment costs.* Most outdoor stress-challenge activities require equipment to which the average school does not have access, such as climbing ropes, harnesses, tents, packs, or canoes. The expense of leasing or purchasing needed equipment clearly acts to inhibit the development of an adequate program.
- *Trained personnel.* In many schools, simply finding staff who are adequately trained in the use of stress-challenge activities with special needs students can be a problem. It is not enough to have a person skilled in outdoor activities directing the program. The person must also be familiar with special students and the activity adaptations that are necessary to meet their unique needs.
- *Health and safety.* Caution for the physical and emotional well being of the student is always a concern. Some activities may not be adaptable to certain populations, and many require skilled supervision to assure student safety.
- *Philosophic restrictions.* Despite the proven benefits of outdoor stress-challenge activities for special students, their very nature often causes them to be viewed as luxuries to which even the best students do not have access. Although there may be many clear arguments to refute this perspective, it is frequently difficult to justify such "privileges" for special needs students.

The group Walk-Talk was developed as a practical adaptation of the outdoor stress-challenge concept which avoided many of these restrictions and proved to be an effective therapeutic tool in working with secondary level special needs students.

RATIONALE

The group Walk-Talk activity was developed as part of the Grundy Alternative School's adaptive physical education and socialization skills curriculum. This school is a self-contained high school program for students who have been identified as having significant behavioral and/or emotional problems in the regular school setting. It is staffed with a full-time teacher coordinator, teacher, and teacher aide. It has access to part-time school social work, psychological, and special education consultation.

The program is designed to help students gain control of their own behavior and return successfully to their home high schools. The school's reality therapy approach to education is grounded in a structured classroom program of specified behavioral expectations and consequences. The concept of responsibility for self is the foundation for helping the students develop improved self-concept and greater emotional stability.

The group Walk-Talk was developed by staff to meet two important needs. Although the program was capable of providing a multifaceted academic curriculum, limitations in the physical plant and recreational equipment made it necessary to devise a variety of alternatives for individualized adaptive physical education. The well-known value of walking as a cardiovascular exercise (Cooper, 1968; Moorehouse & Gross, 1976; Royal Canadian Air Force, 1976) and the proximity of the Illinois-Michigan Canal Trail made walking a particularly practical alternative.

The second need was for a therapeutic restructuring of the learning environment. The formal, structured classroom setting facilitated the development of academic skills and personal responsibility. However, the staff also felt the need for periods of time which allowed for freer, less structured interaction among students and staff. Staff awareness of the effectiveness of outdoor activities in removing classroom barriers to more open teacher-student relationships made them look to an outdoor walk as an attractive, minimally structured alternative learning experience. In such an atmosphere, it was believed that students could talk more openly about personal issues, concerns, and feelings.

PLANNING

Careful planning and preparation for the group Walk-Talk activity were a necessity. Liability, group characteristics, schedules, supervision, goals, and follow-up activities all received special attention.

Liability

Parent permission for the students' participation in the Walk-Talk activity was obtained when each student entered the program. The student's individualized education program (IEP) clearly stated the nature of the activity, its location, and the frequency and duration of the walks. The Walk-Talk was identified as a central part of the student's adaptive physical education program. The parents' signature on the IEP was accepted as permission for the student to participate in the program.

It is recommended that a form which clearly specifies the nature of the activity, obtains parent permission for student participation, and waivers reasonable liability be drafted by any school implementing this program. However, it must be noted that the school and teacher(s) involved must take responsible actions to assure that the activity is safe, well supervised, and conducive to the positive growth of the participating students. Planning is the essential key to this goal.

Assessing the Group

An accurate assessment of the basic characteristics of the group was the most crucial consideration prior to initiating the activity. The staff used a variety of increasingly difficult group problem-solving exercises to assess the levels of cohesiveness and personal responsibility within the group.

Activities ranged from simple values discussions and trust walks (e.g., group members leading blindfolded members around the classroom) to trustfalls (i.e., the group forms a "net" with their arms to catch students as they fall backwards) and rope corrals, in which the group is placed in a 5-foot, roped-in "corral," given a 12-foot 4" × 4" board, and challenged to get all members out of the corral without touching or going under the rope.

These mild stress-challenge situations served as learning experiences which helped the students achieve the readiness level necessary to undertake a group walk. They were considered ready for the activity when they demonstrated the ability to view themselves as a group, use positive leadership and follower skills, maintain constructive group effort in the face of mildly difficult problems, and share as a group the pride of solving these problems. Depending upon the particular characteristics and composition of the group (size, gender mixture, severity of handicaps, etc.), approximately four to eight weeks are required for groups to develop these positive group traits.

Scheduling

Walks were scheduled along increments which maintained an adequate level of physical stress and moved the group toward its final goal. Initially scheduled for two days per week, the walks were eventually increased to three days per week. Each walk was paced at a normal gait of approximately 120 steps per minute or three miles per hour. The walks, beginning in mid-September, were scheduled for a duration of 20 minutes, and were increased each week by another 15 to 20 minutes. The day before the school's Thanksgiving vacation, the group completed its goal of a 10+ mile walk. After November, winter walks were scheduled as weather permitted.

Supervision

Although supervision may at first appear to be a most critical issue in such planned walks, the initial assessment of group characteristics and the ongoing monitoring of individual problems made it less difficult than initially anticipated. Rules for the group Walk-Talk were relatively simple:

- Stay together.
- Act appropriately.

Inappropriate behavior was defined as significant lagging behind or running ahead of the group; physical or verbal aggressiveness toward group members or staff; unacceptable language (cursing, teasing, etc.); and actions which disrupted or destroyed the natural surroundings, such as breaking tree limbs, picking flowers, throwing rocks, or going off the trail unnecessarily.

Clear consequences were established for inappropriate behavior. Walks were terminated when any member of the group acted inappropriately and would not take personal responsibility for correcting the behavior. These general guidelines naturally led some students to test the situation by using inappropriate behaviors purposefully to terminate walks. In some instances, the walks were stopped mid-way and the group was not allowed to continue until the problem was successfully resolved. In general, however, once the students realized that they would experience the logical consequences for their behavior, they were able to assume greater responsibility for their actions with relative ease. These consequences included normal school consequences for inappropriate behavior and group discussions (either on the trail or back on the school grounds) centering on what went wrong and how to correct the situation.

The initial walks were planned to include all three full-time staff members and provide a ratio of less than three students to one staff person. After the first few walks, it became apparent that two staff members could provide adequate supervision and behavior management. However, the lower ratio was seldom used. The staff discovered that the number of individual students wanting to talk about pressing problems or general concerns exceeded the staff's ability to provide one-to-one attention. The majority of walks, therefore, included all three staff. On certain occasions, more responsible members of the group were paired with other students in a peer listener role.

Follow-Up Activities

Unlike many secondary physical education activities, the walks were not seen as a separate, specialized activity designed primarily to meet physical or recreational needs. Rather, they were treated as a natural extension of the academic and affective program. The teaching staff used the real, concrete experience of the group Walk-Talk activity as an important link to academic learning and social/emotional growth.

Academic follow-up activities were often structured around questions that were raised during the walks. These covered a wide range of topics.

- Levels of government *(Who owns the canal and trail?)*
- Local flora and fauna *(What kind of plant is this?)*
- Weather *(It was so nice yesterday! How can it get cold so fast?)*
- Seasons *(The trees sure are pretty. Aren't they changing colors kind of early?)*
- History *(Who built this canal?)*
- Math problems involving distance, volume, speed, and height *(How fast are we walking? How big is that tree? How much water do you think the canal holds?)*

Follow-up activities which focused on affective development included informal group discussions of interpersonal problems, group concerns, positive experiences which occurred on the walk, and individual support for students who disclosed personal concerns during the walk. Frequently, group issues generated on a walk were brought up in more formal group settings led by the school social worker.

The staff also made special efforts to formally and informally reinforce the group's feelings of success in completing the walks. Group photographs taken at various stages of the walks, as well as buttons indicating successful completion of the 10+ mile walk, were given to the students.

Perhaps the most powerful form of affective follow-up was provided by the students themselves. It was not uncommon for concerned students to ask the staff what they might do to help particular students who shared their problems with them on the trail. Such peer support was a powerful outcome of the walks and of the informal guidance and role modeling the staff provided. It became very common for students to use the successful walk experiences as the basis for encouraging and supporting other students who were experiencing difficulties. ("Hey, man, if you could walk six miles this morning, you can sure do that silly math problem!")

DISCUSSION

No formal, quantitative evaluation of the group Walk-Talk activity has been conducted to date; however, the qualitative observations of both staff and students strongly suggest that the activity is an effective component of the total school program. It was implemented with virtually no additional program costs. Weather posed no significant problem and seldom caused a walk to be canceled.

Although low levels of physical conditioning or other health limitations may at first seem to be a factor that would hinder some students' ability to participate, in actual practice it was found that the rate of walking was well within the ability of all students. In the second year of the walks, a neurologically impaired student was able to participate with only minor changes in the group's rate of progress.

The amount of walking was regulated so that even the least fit individual could endure the regimen. Gradual increases in expected performance levels pushed individuals beyond their prior limits and provided the stress necessary for growth. Students were observed to experience healthy levels of fatigue following each walk. They also demonstrated a significant increase in endurance as the walks continued.

Peer Relationships

The group Walk-Talk activity appeared to have a significant positive effect on peer relationships among the students. A significant increase in talking among the students during the walks was observed in comparison to conversation during earned morning, lunch, and afternoon breaks. Interactions increased, both in frequency and in the variety of associations among group members. Staff observed students pair off with peers in order to talk, listen, and support. Such support dyads appeared to change from day to day depending on the status and issues of each individual student.

An increased focus on the group as a whole was also observed. The commonality of the group experience created issues such as cohesiveness (lagging behind or running ahead) and personal responsibility while in the group (choosing to behave or misbehave on the trail). As the walks continued, the students were observed to capitalize increasingly on their sense of cohesiveness and shared success to support themselves and others.

The restructured learning environment provided by the walks appeared to significantly increase the staff's therapeutic access to the students and to facilitate student-staff relationships. For some students, the walks represented periods of significant introspection. At times, an individual staff member and student "detached" from the group to deal with very specific issues. Unscheduled walks were occasionally used as spontaneous informal interventions aimed at helping specific students defuse their problems appropriately. Students were also observed to express themselves more openly in formal settings as the ability to safely express their concerns on the walks eventually generalized to the classroom.

Advantages for Public School Programs

The group Walk-Talk activity represents a practical adaptation of the outdoor stress-challenge concept which can be accessible to most public school special education programs. In most areas of the country, walks can be made during most of the regular school year. They can be conducted on trails which already exist near the school or, where permissible, on "community trails" which the students plan and map as part of their academic curriculum.

Walking can be easily supervised by most teachers. Unlike some outdoor stress-challenge activities, it requires little if any specialized training. Familiarity with basic group dynamics for the pre-walk assessment is the one area where additional training would be beneficial.

Group walks involve few significant health or safety limitations. The nature of the activity makes it a very beneficial exercise for a wide range of students who exhibit a variety of levels of fitness and learning problems. The minimal or nonexistent cost factors make it highly cost-effective and more acceptable to some educators than so-called "luxury" activities.

Perhaps the greatest potential of the group Walk-Talk lies in the effective therapeutic access it provides. As one student groaned to the staff before a walk, "I don't want to walk because when I walk I think. And when I think, I talk."

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Learning through Outdoor Adventure Education

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CHRISTOPHER C. ROLAND
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■ Participation in recreational sports and movement activites, for all children and adults, is an important avenue to developing a richer and fuller understanding of one's own strengths and inner resources. Access to this dimension of growth is no less important for special needs individuals.

Most moderately and severely disabled persons are involved in daily education and rehabilitation programs that do not necessarily include recreation. Recreational sports and movement activities are inherently reinforcing and a physically beneficial means of promoting mobility learning, social interaction, and greater self reliance.

ADDRESSING SPECIAL NEEDS AT CAMP RIVERWOOD

Since 1978, the National Football League Players Association has sponsored a Special Needs Sports and Movement Camp for persons with moderate to severe disabilities at Camp Riverwood in Winchendon, Massachusetts.

Camp Riverwood's conceptual origin was similar to that of the Special Olympics in its intent to train individuals with handicaps for single event competition. As the program evolved, however, its focus was enlarged to include movement and outdoor exploration. This departure from individual event competition toward a more integrated perspective of sports, movement, and outdoor exploration focuses on individual growth in the context of group participation.

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The aim of Camp Riverwood is to help disabled persons achieve greater physical, mental, emotional, and social awareness and growth through a well planned, sequenced series of activities. General goals for each camper are the development of self confidence and trust.

More specific goals include improvement in socialization skills, interpersonal relationship skills, and level of independence. Other critical goals include enhancement of verbal and nonverbal communication, physical mobility and coordination, and individual and group initiative. Self reliance and group membership are two key constructs of the camp philosophy.

Enrolled over a 2 week period during the summer of 1980 were 110 campers ranging in age from 9 to 56 years old, with a primary diagnosis of moderate to severe mental retardation. Many exhibited accompanying behavioral problems. Fifty percent of all campers were on medication for a variety of reasons, including seizures, hallucinations, hyperactivity, and aggressive behaviors. Twenty-five percent were subject to seizures. Most were able to feed themselves and were toilet trained; all were ambulatory. Expressive and receptive language skills were highly divergent. Because of the physical limitations of the camp setting, persons in wheelchairs and those with severe visual impairments could not be accepted.

The campers came from a variety of settings, including private homes, group homes, foster homes, and state residential facilities. For most, this was their first overnight camping experience away from their yearly living environment. For all of them, it was their first participation in outdoor exploration and movement activities.

"Games are not so much a way of comparing our abilities as a way to celebrate them." (Fluegelman, 1977)

Two camp sessions, each 1 week in length, were conducted. Activities included aerobics, outdoor exploration, New Games, track events, swimming, field events, and quiet recreation activities. Each of the 9 activity instructors had extensive professional training and certification in their area of expertise. In addition, there were 2 head counselors, 18 general counselors, and 2 full-time registered nurses.

ACTIVITY GOALS

The goals of adventure/initiative activities for this special needs population included the following:

1. To enhance gross motor skills.
2. To enhance receptive (listening) skills.
3. To enhance expressive skills (communicating one's thoughts/feelings).
4. To develop analytical problem-solving abilities.
5. To develop cooperation skills within a group setting.
6. To develop an awareness of one's abilities and capabilities.

A primary goal for the camp's staff was that of attitudinal change toward the handicapped. "She can't do that," or "He might get hurt," or "They wouldn't like it, anyway," were frequent staff comments. It was hoped that an adventure program might indeed change camp staff perceptions of the abilities and potential of disabled persons. In addition, because camp staff members participated in activities *along with* the campers, they shared similar experiences, sensations, and perceptions.

Campers were divided into heterogeneous groups loosely based upon age. Each outdoor adventure activity group consisted of 10 to 12 campers, 2 counselors, a registered nurse, and 2 qualified instructors.

ADVENTURE ACTIVITIES

Three phases of adventure activities were conducted in an intentional, progressive order: (a) New Games, (b) Initiative/Problem Solving Tasks and (c) Ropes Course. Although the three areas had similar program goals, each one presented unique challenges to the group members.

New Games

Bolstered by the notion that "winning isn't everything—it's the only thing," the stress of competition discourages many persons from participating in physical activity. Games such as basketball and football are properly referred to as *exclusive* sports or games; only a chosen few "make the team." Those who lack the necessary degree of skill become observers. The result is a sit-and-watch phenomenon, as witnessed by the 86 million fans who attended professional football, baseball, and hockey games in 1977 (Fluegelman, 1977).

New Games are an alternative to the traditionally competitive physical and educational curriculum. They are becoming more and more popular because they emphasize *inclusiveness* rather than exclusiveness. No one is eliminated from these games; everybody wins. Following are two examples of New Games.

The Octopus

Setting: Outside or in a school gym
Materials: None
Preparation: Two parallel lines are drawn, allowing a big enough space for students to run from one line to another and enough lateral movement to run in many directions.
Directions: One student is selected as the OCTOPUS and placed in the center of the open space. The rest of the group lines up on one side behind the line facing the center. The teacher tells the group the following brief story. (Its complexity can vary according to the language comprehension skills of the group.) "The OCTOPUS likes to catch people with its sticky, gooey tentacles. This is the way it grows. When the OCTOPUS says 'Go home,' you must run to the other side and cross the line without getting touched. If the OCTOPUS touches you, hold tentacles with the OCTOPUS and help him grow." Keep the game going until all group members have become part of the dreaded OCTOPUS. Give several different group members a chance to start the game.

Pin Ball

Setting: Outside or in a school gym
Materials: Playground ball (size may vary according to the skills of the group)
Preparation: Students form a large circle, facing away from the center of the circle, with their legs spread wide apart and feet touching their neighbors' feet. Teacher or student stands in the middle of the circle holding the ball.
Directions: "You are a human pinball machine. Bend forward at the waist and look at me through your legs." (Teacher models this behavior.) "Try to keep the ball in the circle and do not let it go through your legs. When the ball comes to you, use your hands to hit the ball to someone else." The person in the middle starts the game by rolling the ball toward a player and then joins the circle. The game continues until the score of 5. Give several group members a chance to start the game.

Teachers interested in using New Games in the classroom may wish to consult books by Fluegelman, 1977; Orlick, 1978; Roland & Havens, 1981; and Schneider, 1976.

Initiative/Problem Solving Tasks

These tasks are posed to a group comprised of a minimum of 5 individuals. Solutions are designed to require the combined effort of all group members; no single member can solve the problem alone. Rohnke (1977) commented:

> The outdoor initiative tasks in particular give groups of students a series of clearly defined, physical problems. They are designed so that each group must attempt to work out its own solution. . . .Participants work on the problem in groups in order to take advantage of the combined physical and mental strength of a team. (p. 65)

Following is an example of an Initiative/Problem Solving Task.

Poison Peanut Butter Pit

Setting: Outdoors at a large sand pit or indoors at a large marked-off rectangular or square area.
Materials: Planks of wood, wide enough to walk on, but when stretched end to end, not long enough to reach from side to side of the sand pit
Preparation: Group members are standing near the sand pit. The wooden planks lie near the pit in no specific order.
Directions: The teacher tells the following brief story: "You are running away from some lions and tigers. The only way to safety is to cross the Poison Peanut Butter Pit. How can you get across to the other side? Remember, all your friends must go with you." The team members must think of a way to cross the pit and then be able to execute the plan successfully.
Solution: Lay the wooden planks across the pit with enough space between each plank to allow the members to make small skips from plank to plank until they all get across. The length and width of the planks can be modified to accommodate the skills of the group.

Getting across the Poison Peanut Butter Pit requires that everyone work together.

The following sources provide an excellent introduction to Initiative Tasks, as well as numerous activities to implement: Darst, 1980; Rohnke, 1977; Roland and Havens, 1981.

With the campers at Riverwood, Initiative Tasks not only brought out the group's problem solving abilities, but also facilitated effective decision making and promoted peer interaction, interdependence, and leadership. Overall, they molded a collection of individuals into a functioning group.

Ropes Course

Once the members had established a cohesive group structure and a mutual support system, they were ready for the third and final activity: the Ropes Course. Here, the tasks were purely individual, yet the need for continued group support was ever-present.

A Ropes Course consists of a series of strong ropes and wire cables that can rise from 4 feet up to 40 feet above the ground. All participants and instructors tie a swiss seat on themselves before the activity begins. The swiss seat is a proven mountaineering harness to which ropes can be attached.

Before climbing, the individual hooks onto a belay system; a goldline rope is attached to the person, then passed over a wire, through two safety hooks, and back to the ground to an instructor who holds it. Once these steps have been completed, the individual can begin climbing on the ropes and cables. Each person is safely guided by staff, two of whom are in the trees and two on the ground. In the rare case of a fall, the person is safely held on the rope by the instructor.

The Ropes Course is an individual challenge, yet group support provides needed encouragement.

Debriefing helps participants get the most out of their experiences.

DEBRIEFING

Too often, an adventure activity is immediately followed by another activity, another class, free time, or a bus ride home. The full significance of the activity is not truly realized, and potential benefits are unfortunately lost.

For maximum benefit to occur, a crucial procedure commonly referred to as *debriefing* follows each of the sequential activities. Debriefing can take place at many levels of awareness and expressive skill development in order to accommodate a wide range of disabilities.

The debriefing technique at Camp Riverwood was found to be most effective when conducted in the following sequence:

1. Immediately following an activity, have the group sit in a circle. (If the ground is wet, be sure to bring a covering.) The instructor should be positioned so that the entire group is able to see.
2. Ask the group to identify what they just did.
3. Ask each individual whether they enjoyed the activity, and if not, why not.
4. Ask the group members to describe how they felt about the activity. Was it easy, difficult, scary?
5. Ask the group what person or persons came up with ideas that helped to solve the problem.
6. Ask if there was group support. Did anyone help a friend?
7. Try to bring out students' feelings about their own performance and that of others. Be sure to accept each student's feelings and ideas; this important teacher attitude is sometimes forgotten.
8. Help students summarize the activity by asking them to review the major sequences of events and interactions (a quick review of questions 1 through 7).

A sample dialogue follows between an instructor and a group of campers who have just completed an activity requiring the entire group to climb through a rubber tire suspended above the ground between two trees before they get swept away by an imaginary tidal wave. The tire is too high off the ground for someone to get through without support.

Instructor: "Can someone tell me what you all just did?"

Lillian: "Went through hole."

Instructor: "What was the problem you had to solve?" (Silence)

Instructor: "What did you have to do?"

Peter: "Get through hole."

Instructor: "Why?"

Martin: "Water was coming."

Instructor: "Right! The huge tidal wave was coming. Who came up with an idea?"

Martin: "Billy!" (Billy smiles.)

Instructor: "Well, what was his idea?"

Emily: "Billy found a thing to climb on and get through the hole."

Instructor: "Did it work?"

Group: "Yea!"

Instructor: "Who helped?"

Courtney: "Amy, David, Michael, and Andrea."

Instructor: "Very good. Do you think helping is important?"

Group: "Yes."

Instructor: "Why?"

Peter: "We couldn't do it alone."

Instructor: "That's right; everybody has to help each other to get something done. Kristin, at first you didn't want to go through the tire, did you?"

Kristin: "No."

Instructor: "But you did it, right?"

Kristin: "Uh huh."

Instructor: "Remember, a lot of people are sometimes afraid of things. You're not the only one! Now, before we go to the next activity, let's see if we can all remember the different things we did to solve the problem."

Instructor: "What happened first?"

Loren: "We tried to climb through the hole. But it too high!"

Instructor: "Very good, Loren. What happened next?"

Nick: "We climbed on Martin's back."

Instructor: "Did that work?"

Group: "No. Billy found a box."

Instructor: "Right. What happened next?"

Billy: "Martin climbed in hole and helped Courtney."

Instructor: "Did everyone get through the hole?"

Group: "Yea."

Nina: "Kristin had a hard time."

Instructor: "What happened? Did Kristin make it?"

Group: "Yes. We all helped."

Instructor: "Very good work. You all worked together. Everyone was saved from the tidal wave. Let's do the next activity."

ADAPTING ADVENTURE ACTIVITIES

Elements of the adventure program can be easily duplicated, either in whole or in part. School programs have the distinct advantage of being able to structure a 9 month program for the same group or different groups of students, allowing them to progress at a steady pace throughout a sequence of activities. (For a list and description of the New Games and Initiative/Problem Solving Activities, as well as an explanation and diagram of the Camp Riverwood Ropes Course, write Dr. Roger D. Frant, School of Education, 166 Hills South, University of Massachusetts, Amherst MA 01003.)

New Games and Initiative Tasks lend themselves easily to adaptations based on learner and/or environmental variables. The activities can be adapted as a whole or incorporated into physical education, recess, morning opening exercises, as energizers throughout the day, or as motivators. Most required equipment and materials are either minimal in cost or are already available in schools. Schools have the open space, both indoors and out, that is necessary for most tasks. Others are easily adapted to smaller spaces.

Because the activities are primarily action oriented, verbal directions and story lines can vary from simple to complex. Task difficulty can be geared to the skill level of the group, and activities can be modified for persons with severe physical, visual, and/or hearing impairments.

A school program of this type was designed and implemented in Derry, New Hampshire, for Project TRAILS (Teaching Retarded Adolescents Independent Living Skills) from 1977 to 1979. New Games, Initiative Tasks, and an indoor Ropes Course were all offered. The activities adopted at Camp Riverwood and in Derry are traceable to Project Adventure, developed and implemented at Hamilton-Wenham Junior and Senior High School in Massachusetts (Rohnke, 1977). Project Adventure ideas were also adopted by Project UMPA (Urban Modification of Project Adventure) in Cambridge, Massachusetts.

These programs were implemented with limited funds, yet proved to be successful as well as rewarding for all participants. Starting a program of New Games and Initiative Tasks in a school requires no immediate cost. Materials that are not already a part of the school equipment inventory can be made by teachers and students or donated by families or community groups.

For information about workshops in New Games, contact the New Games Foundation (Fluegelman, 1977). While no formal training is mandatory, teachers should attend New Games workshops or participate in New Games and Initiative Tasks themselves prior to implementing a program in the schools.

A Ropes Course, on the other hand, requires considerable forethought, training, and capital expense. Qualified personnel must be contacted if this third sequence is to be implemented. Teachers interested in training and design of Ropes Courses should contact Carl Rohnke (1977) or Chris Roland (1981).

DIMENSIONS OF PERSONAL GROWTH

For teachers, the most exciting part of using adventure activities and New Games are the tangible results. Among the benefits readily observed at Camp Riverwood were the following:

- *Verbalizations.* Many campers increased the rate and appropriateness of their verbal communications. Responses were encouraged by frequent questioning. "Why? Please explain." Expressive language was further motivated in the context of successfully shared experiences and challenges that were met and completed.
- *Cooperation/Group Membership.* Campers completed problem solving activities in a group setting, and supported other campers during the Ropes Course activities. Each camper shared responsibility for the safety and well being of others. A feeling of belonging was fostered.
- *Affective Development.* Adventure activities encouraged expression of a wide range of emotions. Elation, fear, anger, wonderment, and satisfaction were all experienced and expressed.
- *Success at Risk Taking.* All campers had the opportunity to take physical and psychological risks. Taking a risk presupposes trust—trust in yourself, trust in your instructor. The level of risk is never an absolute measure. For some, walking on a rope stretched 40 feet over the ground is a risk; for others, walking on a balance beam placed on the floor is an equivalent risk. Positive feelings of accomplishment were assured because all activities could be completed at an individual level of skill readiness.
- *Problem Solving.* All too often, daily decisions are made by others for persons who are moderately or severely retarded. Adventure activities and New Games allow the individual to make independent decisions and solve problems with group support.
- *Nature and Outdoors.* Active outdoor activity has its own reinforcing qualities for most campers. Unlike their yearly living arrangements, this is a relatively new environment. Being outdoors requires different behaviors and fosters the discovery of previously untapped personal resources.
- *Physical Fitness.* Participation in outdoor activities promotes physical fitness through the enhancement of flexibility, strength, and endurance. With sequenced introduction of activities, each camper has the opportunity to proceed on an individually appropriate level.

Outdoor activities and New Games also allow professional staff to view disabled persons in a new setting—a positive, supportive environment with fewer traditional cues that suggest, "No, you can't." Each staff member participated hand-in-hand with the campers. Together they learned, and together they discovered a common ground of respect and success.

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Integrating Curriculum Objectives

Into Your Outdoor Education Program

Margaret Malsam Leonard Nelson

A structured curriculum with specific objectives . . . a magnificent Rocky Mountain setting . . . high school students trained as leaders . . . all these factors contribute to making the Northglenn-Thornton, Colorado, outdoor education program a stimulating learning experience. Adams County School District 12 operates its comprehensive four-day outdoor education program for sixth grade students in beautiful Covenant Heights Camp near Rocky Mountain National Park. The program reinforces district curriculum objectives in math, social studies, language arts, science, fine art, health and physical education. It also gives students opportunities to learn new responsibilities and citizenship skills, another district priority.

Background

School District 12 started the outdoor education program in 1972 to reinforce environmental concepts, provide environmental skills and develop attitudinal changes in relation to the environment. Since implementing the program, the district has continued to refine the curriculum. According to Leonard Nelson, program director for environmental/outdoor education, many other school districts in Colorado have modeled their outdoor education programs after that of School District 12.

Perhaps the program's most innovative component is the involvement of high school leaders, a practice adopted from a program in Jefferson County, Colorado. About 100 tenth through twelfth grade students are selected each year to work with the sixth grade teachers in conducting the outdoor education experience for sixth graders.

Teachers new to the district attend an on-site workshop to acquaint them with the program organization and curriculum. Each school then conducts a planning session to tailor the program to its individual needs. Special programs are held for parents at each school a few weeks prior to the outdoor education experience. A slide/tape production shows students participating in a typical week-long session. In viewing the presentation, parents can see the dorms and outdoor environment where students will live and learn. An open house is also held each fall at Covenant Heights so that parents and the public can see the facilities and program.

Sometimes schools conduct various fund-raising projects to help defray student fees—an amount equivalent to the cost of food and lodging.

The actual cost of the program (including transportation, staff, materials etc.) is more than the student fee; the district picks up the additional cost as part of the regular sixth-grade curriculum.

Curriculum Correlation

The outdoor education program is structured to both support and reinforce classroom learning by giving students a chance to apply their knowledge. The curriculum directly supports district priorities of citizenship and student achievement as outlined.

Outdoor activities are as follows: (1) astronomy, (2) Enos Mills, (3) winter survival, (4) orienteering, (5) ropes, (6) Wild Basin and (7) crafts. The astronomy program uses telescopes in a day and night program, reinforcing science curriculum objectives. Phase I of the astronomy program takes place in the classroom where teachers introduce students to historical views of astronomy, familiarize them with basic principles and purposes of telescopes and try to increase their environmental awareness. Phase II takes place at camp. The students use the telescopes during the day to learn about life zones and at night to observe stars, planets, and other astronomical phenomena.

During the Enos Mills section, children have the opportunity to visit the 1885 homestead of "the father of the Rocky Mountain National Park." Enos Mills was one of the nation's first and foremost environmentalists. He achieved much while still in his teens, and his research and writings are displayed in the natural environment where he produced them. After visiting the cabin and participating in a discussion about Mills's role in Colorado and American history, children write prose and poetry about their feelings and impressions. They also participate in guided nature walks conducted by Edna Kiley, the late naturalist's daughter. She gives the students firsthand information about Colorado history and a significant ecological insight into the mountain environment. This unit ties in directly with the social studies, language arts and natural science curricula dealing with Colorado history, composition, group discussion, poetry and forestry.

Correlation of Student Outcomes with District Priority Goals

District Priority Goals	Outdoor Education Outcomes Which Support This Goal
Citizenship: Affective education— . . . each school will have in operation an effective education program for students which will include but not be limited to the development of responsibility, self-esteem and self-direction.	As a result of participating in the outdoor education program, students will • experience an improvement in interpersonal relationships. • develop a positive self-image and an improved attitude toward school. • show greater acceptance of responsibilities.
Student Achievement: The attainment of skills, knowledge and development of attitudes as defined by the district-approved curriculum.	As a result of participating in the Outdoor Education Program, students will • demonstrate increased understanding of ecological environmental and historical concepts. • develop outdoor living and survival skills.

Winter survival teaches students survival tactics for the severe Colorado winters. The unit's core is centered around man's basic needs for food, water, shelter and clothing and how these can be met on an everyday and emergency basis. Activities deal with plant and animal survival, shelter and fire building, first aid and safety, and how to dress properly for cold weather. This unit dovetails with science and health curricula covering ecological relationships, first aid, good health and well-being.

The ropes class supports the physical education and health curricula and challenges students' physical and mental abilities. As students walk the high or low ropes obstacle course, they test their individual physical coordination and also align their physical dexterity with that of the group. Safety is always emphasized, and different types of crawls and walks are taught. Included in this section is a "trust fall" in which a student stands upon a platform about five feet high and falls backwards into the arms of ten or twelve students and instructors. Perhaps the most important aspect of this class is the self-confidence each participant develops. In the words of one sixth grader, "I learned balance, self-control and self-confidence; I learned that I could do more than I thought I could."

The orienteering activities give students an opportunity to attain compass and map-reading skills. "Orienteering" is a coined word describing the use of map and compass skills to find one's way across familiar or unfamiliar territory in either recreational or competitive activities. This class supports language arts and mathematics objectives dealing with interpolation, counting, estimating, arithmetic functions, writing and composition skills, interpreting directions, and step-by-step sequencing.

The Wild Basin class offers hiking (or snowshoeing in winter), ecology and geology studies, and nature appreciation. Since this class occurs on both national forest land and within Rocky Mountain National Park, the students learn about the differences be-

tween these two governmental entities. These activities integrate with the science and health curricula dealing with good health and well-being, lifetime sports (hiking, snowshoeing) and basic ecological relationships.

A crafts program allows students to produce a nature-related project—either a sand painting or a nature weaving. This activity serves a dual purpose: in addition to supporting fine arts objectives dealing with weaving and drawing, it provides each student with a memento of the outdoor education experience.

A registered nurse is available at all times in the health lodge, a cabin especially designated to handle any first-aid or health problems. She also explains preventive health measures in a class on first aid and safety in the outdoors, where students examine topics such as hypothermia, frostbite and dressing properly for cold weather.

Students learn good citizenship and interpersonal skills in the dining hall and through the dormitory living arrangements. They eat three well-balanced meals a day in a family style eating arrangement that involves everyone in table setting, serving and cleaning up. A large sign in the dormitory reads: "Your mother isn't here; you'll have to pick up after yourself." Students make their own beds and clean the bathrooms.

Results

Questionnaires returned by teachers, parents, high school leaders and students have repeatedly shown positive attitudes toward program content, organization and effect. Major strengths of the program indicated by all respondents are:

- teaches independence and responsibility,
- provides for cooperative group interactions,
- develops trust and respect for teachers, leaders and other students,
- is a confidence builder for students, and
- brings students to application level in cognitive and affective learning.

When the resident outdoor education program is completed, schools may participate in the urban education and community programs, which allow students to contrast the natural mountain environment with the urban environment and in turn analyze their own community in the light of both urban and resident mountain experiences. Five schools now use regional transportation district (RTD) buses instead of school district buses to transport students to downtown Denver. This not only conserves fuel but also provides an introduction to the mass transit system.

The School District 12 outdoor education program allows students to increase their knowledge and understanding of the balance of nature and problems concerning man and his natural environment. It also provides activities—both cognitive and affective—that integrate and support district priorities.

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English in the Treetops

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by Peter G. Beidler

"I can't do it. I just can't. Don't make me try. It's too far down. Please don't make me go across." The horizontal 300-foot rope stretched in front of the waterfall and over the rocks a hundred feet below. It looked like a spider's filament, and Moji was scared.

I want to tell you about Moji, and about why she and eight other Lehigh University freshmen were with me in the woods in northern Pennsylvania on a chilly day in April, 1985, looking at a tyrolean traverse stretched across Angel Falls.

Vacations and Bad Teaching

I teach English at Lehigh University. I have done so for twenty years. One of my favorite courses is the one I teach almost every semester: good old English 1, the basic required composition course. I do not love grading papers, but I do love first-semester freshman students. Well, most of them.

The spring, 1985, course was a particular challenge. For one thing, with 27 freshmen it was too big for one section but not big enough for a split into two. For another, it was an uncomfortable mix of students. Approximately a third of the students were first-semester freshmen who for one reason or another had not enrolled at Lehigh in the fall semester. Another third was transfer students, and the final third had failed the course at least once and were trying again.

Majisola Shabi was one of these last. I later learned that Mojisola — who preferred to be called Moji — was born in Brooklyn to parents who had been born in Africa. She was an engineering student, and writing was **not** her favorite activity.

During the first week of classes I told my students my basic expectations in a freshman theme: a bold thesis, specific support for the thesis, and a clear organizational principle. Then in the second week I had my students write an in-class theme on one of several topics. The topic Moji chose to write on was "College: A Vacation from Home?" I reproduce the theme below, purged of the twenty-odd spelling and punctuation errors it contained:

> College Is Not a Vacation
>
> When entering college for the first time the college freshman is filled with anxiety, with exhilaration, and with anticipation.
>
> And why not? He is about to embark on an experience which most likely will never occur again in his life. For the first time he is pretty much on his own. Even though mom and dad are a phone call away or a two-hour bus ride away, he is going to have to do things which he never had to do, i.e. the laundry, and make decisions he never had to make. The thought of all this is exciting so that it feels that one is on a vacation, on a break. Things like throwing out the garbage, walking the dog, or watching over the younger siblings are left ninety to a hundred miles away. One feels that this is the time for me and for me to do what I want.
>
> A vacation, in my opinion, is a break; a break in a length of time or work. A vacation is used to relax, to enjoy, and most important to keep worries and problems out of one's mind. A vacation should be a selfish act in that it is a time for you and the ones you are with to pamper and enjoy themselves.
>
> I'm sure most people would agree with me to a certain extent, from the busy executive to pressured student. But I feel college students, in particular, college freshmen, feel that the university is a "break" from the pressures and worries of home, but are rudely awakened by the fact that college is not quite a vacation and may present more problems than are at home.
>
> But all this could be taken to an extreme. The freshman goes out every weekend and socializing and getting to know people become Priority One. He seems to forget why he is at college in the first and foremost place. But when finals and grades come around his memory is jolted if not kicked. This is the rude awakening. The freshman's retention in the university is at stake, which could trigger a chain reaction such as affect scholarships, future grants, and maybe his future in general.
>
> After first semester of freshmen year he realizes the vacation is over. In college one would probably have to deal with more pressure than he will ever experience after school. So in actuality life is going to be the vacation from college.

It was easy enough to see why Moji had failed English 1 the first time. Because she did not get around to stating a thesis until the end of her fourth paragraph ("college is not quite a vacation and may present more problems than are at home") and then quickly abandoned it, her theme never got very far. Because she offered no specific evidence or personal examples to support any thesis, her theme failed to be convincing or memorable. Because she had no organizational principle, her theme wandered with no apparent aim. Because she never decided on a single point of view, her

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"one's" and "me's" and "you's" and "he's" competed for control. Her logic was faulty (is doing one's laundry an activity usually associated with vacation time?). Her antecedents were vague (just what is "all this" that could be taken to an extreme?). Her thought processes were undeveloped (just why, in that last sentence, is "life," whatever that is, going to be a "vacation from college"?).

Moji had a problem.

As her English teacher, I had a problem, also. How was I to help her to improve her writing? How was I to take a young woman who had so little to say and help her to say it better?

With twenty years of experience behind me, I had some ideas about how to proceed. The comment I wrote on that first theme turned out to be longer than the theme itself. I explained how Moji must state a thesis earlier in the theme. I wrote a new introduction for her, one which contained both a thesis statement and an organizational plan. I explained how she should draw from specific experiences she had had last semester that showed how unwise it was to consider college as merely a vacation from home.

My comments were useful, I think, and Moji's revision on that theme as well as her next theme on "bad teaching" were somewhat better than her first effort. Still, something was missing. There was no fire to her writing. It was heartless, perfunctory, and mechanical.

After several weeks of having to read heartless, perfunctory, and mechanical writing from Moji and her classmates, I decided that at least part of the trouble was the writing assignments I was making. How much fire could I expect from those same old theme topics? We English teachers are all familiar with such topics: peer pressure; television; my favorite teacher; my roommate; racism; campus sports; the food in the freshman dining hall. In the hands of our better students, those topics yield pretty decent themes. Each can be dealt with in a couple of pages. Each can be approached in many different ways. Each encourages students to draw from personal experience.

But I was getting bored with reading about such topics, and I sensed that my students were getting bored with writing about them. I decided it was time for a change.

The Call of the Wild.

As a result of a series of circumstances I cannot take the space to explain here, I had been invited to give a talk at the October, 1984, annual convention of the Association for Experiential Education at Lake Junaluska, North Carolina. While there I talked with a number of people about what experiential education was all about. I learned about things called Outward Bound and wilderness treks and high ropes courses. Even then I found myself wondering if there might be ways to work experiential education into the freshman English curriculum.

I knew that students often did their best writing if they wrote about what they knew best — their own personal experiences. In practice that usually meant having them draw from their memories.

Might it be a useful experiment, I wondered, if I provided experiences for my students that they could then write about in their themes? If so, then there would be no need to rely on fuzzy recall of unmemorable experiences.

I decided to talk with some of the people I had met at the Association for Experiential Education in North Carolina. I got in touch with Bill Proudman, director of the Quest Program at Bloomsburg University in northern Pennsylvania. The Quest people routinely organized adventure education courses for Bloomsburg students. They also did contract courses for people not associated with Bloomsburg. I asked Bill if he could help me provide some memorable experiences for some Lehigh freshman English students.

Bill had heard my talk at Lake Junaluska and with very little ado said, "Sure."

Further talks with him and with his assistant, Heidi Hammel, resulted in our reaching agreement on a two-day, three-night, course just before Easter. We would take a two-hour bus trip from Bethlehem to Bloomsburg on Wednesday afternoon and, after some orientation and get-acquainted activities that night, sleep in the main lodge of an unused girl scout camp near Bloomsburg. Later we would split into two groups. Each group would complete a team-building "get the group over the log" exercise, a trust fall, a two-person tight-rope balance, a low-ropes course, a high-ropes course, a tyrolean traverse. We would also have some individual time alone in the woods, as well as camping experience. At the end of two days the two groups would get together again to debrief, turn in their equipment, and leave Saturday morning. Bill Proudman would work with one group and Heidi Hammel with the other.

Having never done any of the activities Bill and Heidi described, I was not sure what I was getting us into, but it sounded like fun and it sounded like the kind of experience that could make for some interesting writing. I asked a few questions about safety, then told Bill and Heidi that I needed two weeks to work on it at my end before I would let them know.

Working on it at my end meant two things: money and students. My first task was to convince my dean and provost that the $65 per student (including instruction, meals, equipment, lodging and transportation) was something worth supporting. They replied quickly and affirmatively.

It was tricky business convincing my students that they should give up three days of their Easter break to join me in the woods to take part in some experiences seemingly irrelevant to freshman English. I think the worst moment came when I told them they would not be able to take a shower during the whole time. But, then, this trip was strictly voluntary and they were free to choose without reward or penalty. Those who opted for a traditional Easter vacation would return to a routine much as they had enjoyed since the beginning of the semester. For those who went to Bloomsburg I would cancel the next five regularly scheduled classes and see that they got credit for two themes from the experience: one would be for keeping a journal while at Bloomsburg; the other would be for writing a theme on something they learned there. Most of my students seemed interested but, at the same time, were puzzled and hesitant. I called Heidi and told her about the puzzlement and the hesitation.

Heidi Hammel suggested that if it would help my students understand what to expect, she could visit Lehigh to show them some slides, to explain more about the program, and to answer any questions they might have. I was happy to accept her offer because I had never met Heidi and I had a number of questions myself, the kinds of questions it is easier to ask face-to-face than over the phone.

She came to my class and we had a good session. Her slides were enticing but more than a little frightening. Heidi and I assured my students that none of them would be forced into any activity they preferred not to do.

In the end two-thirds of my students joined the Bloomsburg expedition. Of those who did not, several had religious conflicts; others had sports conflicts; one or two were afraid.

Moji was afraid, but she went.

From Dusk to First Light.

The bus ride to Bloomsburg was depressing for all of us. At four o'clock that Wednesday afternoon most of the other Lehigh students were heading home to their families, and here we were — off to the wilds. Although we had met together three hours a week for two months in the classroom, we did not know each other well. I was the only one in the class who knew everyone's name. We were sullen and quiet as we dutifully ate the dry turkey sandwiches and the apples that were to be our supper. Looking through the windows of the Lehigh bus, we watched dark clouds gather over a misty dusk.

Upon our arrival in Bloomsburg two hours later, Heidi greeted us. Soon she, Bill, two interns, and eighteen shy Lehigh folk stepped into two vans with overnight bags and headed toward the girl scout lodge.

Once there we played some ice-breaking games. While these made us feel silly at times and were a little threatening, we were pleased with our successes. Group members discovered that they had a lot in common.

Then we had a snack, unrolled sleeping bags and mattresses, and went to bed. We kept the lights on for an hour or so for those who wanted to begin writing in their journals.

Moji Keeps a Journal

Moji began writing that night, lying in her sleeping bag. I shall let her words tell most of her story, along with a few comments interspersed from me. Here is what Moji wrote that first night:

> **April 3.** Hi there. I've decided to write my journal to someone. No one in particular, not even Prof. Beidler. But I think it will be easier for me to express myself if I think someone — anyone — will be reading this.
>
> Well, I must say it has already been an interesting and thought-provoking start. The staff members, Bill, Heidi, Nancy, and Frances, are really nice people. They seem to have their act together emotionally and mentally. I mean, they seem very satisfied with what they are doing with their lives.
>
> I can't say exactly how I feel about being here in Bloomsburg. Like Bill said, we could be worrying about the amount of work we have to do before school resumes. How do I feel about not being home and not **finally** seeing my friends from high school?
>
> I feel excited. I've never done any kind of camping before. I can deal with sleeping on the floor, no shower or toilet, and no concept of time because it is like when my family and I go to Africa, where we live without any electricity at times.
>
> The part that scares me is being able to handle the activities mentally and emotionally. Will I crack up and chicken out? Will I ever realize and utilize my potential? Now that I think about it that is what I am really afraid of. I have been told that I have potential to go far and do great things, but I never seem to get past the average. I hope I get past it during this trip. My arm is getting tired so I'll talk to you later. Bye.

The next morning we split into two groups. One group went off with Bill. I was in Heidi's group. So was Moji. Heidi's group headed off to the low ropes course. The low ropes course involved several group activities. We had to help each other climb over a horizontal log eight feet high. Then we did the "trust fall" in which each of us, in turn, stood on a four-foot high stump, closed our eyes, and fell backwards into the arms of others in the group.

The most memorable event in the low ropes course was the one we came to call "two on a tightrope." Two cables, three feet off the ground, were tied to a single tree at one end but to two different trees, some twelve feet apart, at the other end. The task was to start with a partner on separate cables at the apex of the "V" and gradually move outward. Moji and Christine were partners for this one, but had a hard time of it. When they fell off, Moji bruised her arm. Her second attempt with Tim was a little more successful.

Then we moved on to the high ropes course. Our task was to shinny up a steeply inclined log, climb some pegs to reach the proper level, then walk through a route in the treetops on steel cables. We were always secured by seat harnesses into safety cables so that if we fell off we would dangle rather than crash to the ground. Almost all of us — me included — fell off at least one of the legs of the course. But we had been trained how to pull ourselves back up again. I followed Moji, and I could see how scared she was. She really did not want to be on the high ropes. But she was up there, and she completed the course. She wrote the following journal entry immediately after she reached the ground.

> A sigh of relief is the only sound I can make. The feelings I was going through just now I only remember feeling when I was little under the age of 10. During

> that age period when I was told or saw something scary or frightening I would be terrified for lack of understanding or comprehension.
>
> **Later.**I didn't finish my last entry because I was numb from the experience of the ropes course. Now I think I'm ready to write.
>
> At times I feel stupid because I think everyone in my group must have done something similar to if not exactly like what we've been doing for the past couple of days. I mean, at one point during the ropes course I started to cry. I was terrified, even though I logically knew I was perfectly safe. I felt like a little child. I wanted to be safe on the ground hugging something like a tree or a stuffed bear or a person.
>
> **Later still.** A lot of things that happened on the trip wills stay with me for a while. One thing I realized was that it was all right to cry. I'm the type of person who will not cry no matter what. I probably feel it is a sign of weakness or that crying is a stereotypical characteristic of women. And I don't like to be classified. But when I was on the high ropes and had to change hands on the "hourglass" part I felt like I was going to die. I thought, this must be what it feels like just before you die. That may seem a little harsh, but for some reason something told my mind that even though the high ropes course was probably 98.5% safe, I felt that the 1.5% danger would appear when I was up in the trees.
>
> All this sounds ridiculous considering I was perfectly safe, but I took the course as more than just a game or exercise. It was a test, an aptitude test or a personality test. As for failing or passing, I think I passed with flying colors.

That night we slept at the camp site across a stream. We were not in tents. Our only cover was a large orange tarp strung over a rope between two trees, open on all four sides. We stayed mostly dry when it rained a little, but most of us were uncomfortably cold, even in our goose-down sleeping bags.

The next morning we got up at first light again, had a hasty breakfast of oatmeal and hot chocolate, packed up our gear, and began the one-mile trek to Angel Falls. When we got there we spotted the tyrolean traverse the other group had set up the previous day while we were on the ropes course. Moji panicked when she saw it. "I can't do it," she said.

> **April 4.** My handwriting is messier than usual because I'm freezing. I just got off the traverse ten minutes ago. I am in shock. I'm shocked I actually went through with it and had a minimal amount of fear. I think I was more terrified on the high ropes course than on the traverse. The ropes course helped me deal with my fears.
>
> I wish I wasn't so chicken. I'm not used to being a follower, but in this case I really have no choice. I guess one can't always be in the head. I don't think that anyone in my group thinks less of me because I am not the fastest or the strongest. If anything, they should be proud — no, I should be proud of myself — because I attempted and completed feats that I never really saw myself doing. I've always wanted to go camping and hiking and do almost dangerous things, but I just thought about doing them. "Someday I will," I said. But in the back of my mind I was really thinking, "Fat chance."

On the hike back from the tyrolean traverse we did a "blind man's walk." Moji paired off with Christine again. Moji put on a blindfold, and Christine took her by the hand and led her some 20 yards through the woods to a certain tree or rock. Moji was to play close enough attention with her other senses — to the terrain, to the sounds, to the feel of the rock or tree — that after having been led back to the point of origin, she could remove the blindfold and set out to find that same tree or rock. After Moji had successfully performed the experiment, then Christine put on the blindfold and Moji led her to a different place in the woods.

One of the best parts of the trip was the "time alone." Heidi took each of us to a place off the main trail where we were to spend nearly two hours alone, out of sight of, and unable to hear, anyone else. We were to think or write or listen to the sounds of the woods. Moji used part of her time to write:

> I am now sitting all by myself in a clearing in the woods. Believe it or not, but I am not afraid. I like it a lot. I can talk out loud without anyone thinking I am crazy. I've been alone many times, for many reasons, but this is the first time I'm sincerely and truly enjoying it. I've always wanted to be alone in the woods and feel safe about it. There is something romantic and dramatic about just sitting and writing in the woods. It's like a scene from a movie or a play.

Friday night the two groups got back together and we were all asked to respond orally to several questions: What had we learned? What was the high point of our experience? What did we like best about the person sitting to the right of us around the circle? Moji was impressed with what the group revealed and managed to say a few things beautifully herself. At the final meeting she spoke with considerable eloquence about what the trip had meant to her. Some of that eloquence found its way into her journal:

> I found that when I am faced with an obstacle that makes me hesitant, if I work towards getting past, over, under, or through the obstacle, I surprise myself. I find I have qualities and abilities I never put to use. From the beginning of this trip I was worried about making a fool of myself, of looking like a wimp, of failing. But even in the things I did badly I realize I didn't fail, because each time I learned something. Example: two on a tightrope. I think the reason Christine and I didn't do well, even when I felt calm and balanced, was that there was this small part of me which didn't believe I

> could do it. Even though I was, with all my might, trying to concentrate on balancing, this little voice said, "You'll never make it." But later, when I did make it halfway with Tim, I only felt confident when I look in his eyes. He was smiling and that smile was louder than the little voice.

I shall quote no more from Moji's journal. That journal was of particular interest to me not only because of what it said, but also because Moji was writing differently in that journal than she had in any other writing she had done for me that semester. Most of the awkwardness was gone. She wrote with feeling and conviction about an experience that obviously meant something to her. Did she write with grace, feeling, and conviction because, for once, she had experienced something that did mean something to her? Or was it simply that, freed from the necessity to write a theme, that artificial exercise with a thesis, support, and an organizational pattern, Moji's writing style was able to flourish like a tulip released from the burden of a flat rock?

From Journal to Theme

Naturally I was curious to see whether Moji would write as well when she did her theme based on the Bloomsburg experience. For this theme I asked my students to suggest several topics they would like to write on, and I would pick the one with which I thought they might best succeed with. Moji asked if she could write about her "internal metamorphosis." I told her I thought it would be a fine topic. Here is the theme she turned in.

Internal Metamorphosis.

> When Pete first mentioned the trip to Bloomsburg I was filled with excitement and anticipation because I had never been camping before. But as the day of the trip got closer my excitement lessened and I became worried. I was worried about what this trip might reveal about myself because after Heidi's slide presentation I began to think of the Quest program as a type of self-awareness program. So with that thought in my mind I began to worry whether I would come out of the three-day excursion with anything worthwhile or if I would actually learn something. Well, I must say I returned from Bloomsburg with a lot in tow. Aside from my luggage, I came back with stories of a new and exciting experience, but most important I returned with a new me. No, it wasn't that I changed my hair or lost weight, but I was different inside. I was different in the way I acted, in how I felt, and in what I thought. Because of the trip I've returned to Lehigh with self-confidence, with a sense of appreciation of the things around me, and with a realization of my own potential.
>
> When the bus left the front of Lehigh's University Center on that Wednesday afternoon, I was a girl who was lacking in self-confidence and who constantly wondered what others thought of her. Now I am someone who cares very little what others may think of how I look, act, or dress. I think this new confidence in me came from the support I got from group in Bloomsburg. When I was on the high ropes course I was ready to stop in the middle of the course and turn back. But each time I hesitated to go on I found myself surrounded by people who for some reason had faith in my completing the course. At one point in the course I was scared to move and just felt like crying, yet from behind me I had Pete telling me to take my time. I also had Tim ahead of me advising on what to do and the others on the ground yelling encouragement. At that moment I thought that here is a group of people who didn't even know me, yet were confident I could finish the course. I later realized that I couldn't always rely on others to tell me that I am capable. I had to tell myself. I had to develop the confidence.
>
> After leaving Bloomsburg I became more deliberative. Instead of always looking as if I'm in a rush to be somewhere, I now take my time and am more observant. I'll stop and listen to birds or look more closely at clouds. This all may sound corny and not terribly profound, but the important thing is that I do stop to take notice. This probably grew from my blind walk in the woods because in that activity I had to be more aware of the little things in my surroundings, without sight. So when my blindfold was removed I had to find my way back to where I was previously led. In order to do so I had to recall things like bumps in the path and textures of bark. So now when I walk around campus my pace is less hurried and more leisurely.
>
> I think the biggest change within me I've experienced is that I now realize my potential. For years, teachers and friends have told me I had such potential and that they could see me being famous and doing great things. Yet in school I only did a minimum amount of work and did well. And outside of the security of school I would hesitate in trying new things for fear of not being capable. But Quest helped me prove that I had capacities I had never used. The tyrolean traverse seemed impossible for me to attempt emotionally and physically. Yet when I was harnessed in and hooked on to the rope there was no turning back. I had no choice but to go forward. And when I finished exhaustedly I was amazed at how my terror before going across had turned into an exhiliration of being 100 feet in the air next to a waterfall. I have to admit my realization of my potential was forced upon me in that I was put into situations in which I had no choice but to go on. But the fact that I did go on and sometimes succeeded showed me that in my past there was something mental stopping me from attempting challenging endeavors, whether physical, social, or academic.
>
> How else can I conclude other than saying I had a **great** time and even though I didn't act like it when I was in Bloomsburg, I would go through the experience all over again. I am pleased with the new me and I hope I can continue to develop outside of Bloomsburg, Pennsylvania.

Moji's theme will not earn her a Nobel prize for freshman writing. There were still some spelling and punctuation errors (which I have corrected for her above). There are more serious problems, as well, which almost any reader and, certainly, all more polished writers would notice.

Still, Moji's writing in that theme was far and away the best she had done that year. She had a thesis, a point to make. She used personal examples to support that point. Her theme was organized, with a single point developed in each paragraph. Best of all, she wrote as if she believed in what she was saying, as if she cared, as if she wanted to tell the world — even the narrow world of her English professor — about an experience that was important to her.

Moji was pleased at the grade she got on that theme. "It doesn't seem fair,", she told me. "I really sweated on those other ones and got those bad grades. This one was so **easy** and quick to write, and I got my best grade of the year."

Moji learned something about writing as a result of those days at Bloomsburg: that writing is easier if she has something she wants to say.

I learned something about the teaching of writing as a result of those days at Bloomsburg: that my job as a teacher of writing really extends beyond explaining the principles of writing, assigning topics, and commenting on the writing students do. Part of my job is to arrange experiences through which my students will learn enough about themselves or the world around them that they **want** to tell me about it in words they find are suddenly easy to write.

Thank you, Moji.

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MATHEMATICS MOVES OUTDOORS

By
Liz Hammerman
Murial Titus

Photos by Authors

Mathematics traditionally has been an indoor "sport" a series of grueling exercises in mental gymnastics which may or may not have relevance to the real world. Indoors it provides children with challenges on the chalkboard, problem solving experiences on a theoretical basis, and repetitions of operations on paper. And looming overhead is the constant reminder from teachers and parents that "some day you are going to need these skills."

Children observe adults using math skills when balancing check books, figuring grocery bills, or managing family budgets. If given an allowance, the youngster may have to manage money to provide for his/her designer jean needs and rock concert tickets. Children gain a positive attitude toward mathematics when they use its operations for their needs. Unfortunately, the correlation between what happens in the classroom and what occurs in daily life is seldom seen by youngsters.

Use of the outdoors has proved an exciting approach to the development of math skills. Problem solving activities that relate directly to the "real world" stimulate students' interest and motivates them to learn about their local environment.

The following ten activities involve students in measuring, using numbers, sorting, classifying, investigating, and reasoning in the outdoors. They will use psychomotor skills, communication skills, and discovery learning while interacting with the natural environment. Mathematics in the outdoors help students develop concepts and determine meaningful relationships between mathematics and the world around them.

These activities introduce or reinforce a concept.

1. CALCULATING THE HEIGHT OF TREES AND BUILDINGS (Shadow stick method)

   a. Set up a stick in a vertical position and measure the length of its shadow.

   b Measure the length of the shadow of the tree or building you are estimating.

   c. The length of the shadow of the tree divided by the length of the shadow of the stick times the height of the stick equals the height of the tree.

   Test the theory on an object of known height so the students can assure themselves that this method of estimating is fairly accurate before they try it on objects of unknown height.

2. DETERMINING Pi (π)

   a. You need a large caliper, a tape measure and several round objects to measure. Trees make good subjects.

   b. Measure the circumference of a tree with a tape measure. Carefully place the same size tape measure circle on the ground and lay a stick across the circle. Measure the distance across the circle. Do this for several trees of various sizes. This is diameter.

   c. Make a table of your measurements and try to determine a number relationship between the diameter and circumference. This numeric relationship is called Pi and is used to determine circumference and area of circles.

   Circumference = Diameter x Pi (π is approximately 3.14)

3. GEOMETRIC NATURE TREASURE HUNT

   a. Give students a list of geometric terms and ask them to find examples of each in nature. Don't forget the simple things like points, lines, rays and angles as well as shapes like circles, squares, rectangles, hexagons, etc.

   b. This is a good time to point out how frequently the same shapes are repeated in nature. Examine a honeycomb or wasp's nest. Examine petals on flowers and leaf arrangements to find repeating patterns.

4. SAMPLING - "Do you think we can determine how many stones are on the driveway?"

   a. Calculate the area of the driveway. Take measurements and plot it on grid paper.

   b. Mark off several one square foot areas. Count the stones in each area and average the results.

   c. Calculate the number of stones on the drive by multiplying the area of the drive in square feet by the average number of stones in a one square foot sample.

   d. You can also do this with cornstalks in a field, being careful not to damage the crop or how about blades of grass in the yard?

5. FENCING TASK

   a. Plan the fencing for a given area. Include a 16-foot gate. Use posts at each corner and at each end of the gate.

   b. Measure the fence line.

   c. Plot the area to scale on a grid.

   d. Make a list of materials, including costs.

   e. Calculate cost for the entire fence excluding labor.

   f. How much would be saved if you replaced every other fence post with a cheaper steel post costing $2.00 each? (Corner posts must still be used at corners and each end of the gate.)

   g. Fencing is sold in 20 rod rolls. How many rolls will we need for our ______ foot fence? How many feet are in a 20 rod roll?

Here is a sample cost list.

20 rod roll of fencing	$95.00
Corner posts each	$10.00
Line post each	$5.00
16 ft. gate	$84.00

6. SCALE DRAWING OR MAPPING-MEASUREMENT

   a. Select a suitable area to map. The area should have definite boundaries and a regular shape. It should include several items to be measured and spotted on your map.

   b. Using various measuring devices and graph or grid paper, determine an appropriate scale for the area you are mapping.

   c. It is best to have one student serve as the recorder. Assign various measuring tasks to other students. Work in pairs or small groups.

   d. The objects in the mapping area must be accurately located and measured on the grid.

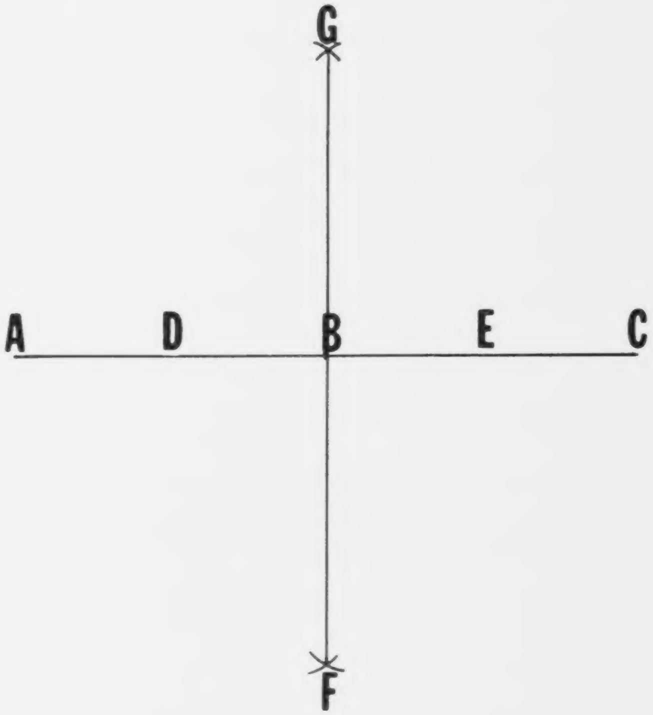
   e. Spotting trees and small objects can be done by plotting coordinates on your grid.

7. ROPE GEOMETRY

   Two students with a rope and a stick can become a human compass. One student stands firmly and pivots while the other forms the necessary arcs at the other end of the rope and marks the ground with a stick.

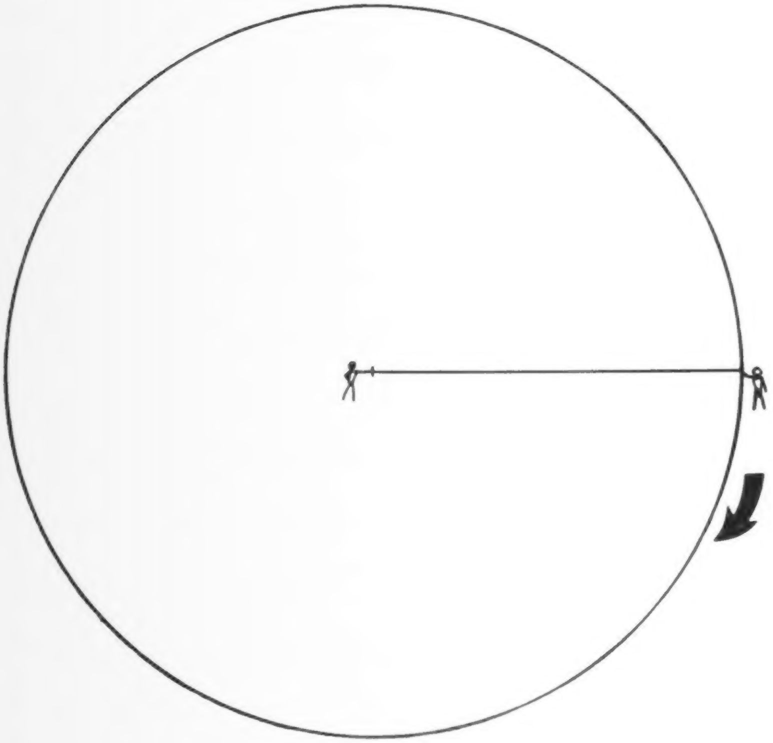
   a. An equilaterial triangle
   Using the rope as a guide, make a straight line on the ground. Keep the rope the same length as the line. Standing first on one end of the line and then on the other, swing an arc above the line. The ends of the line should be connected with the point at which the arcs intersect to form the equilateral triangle.

   b. A perpendicular bisector
   Using the rope as a guide, make a straight line on the ground. Standing at point B form arcs D and E. Make rope slightly longer. Standing at D form an arc above and below the line. Do the same standing at point E. A line that intersects at G and F is a perpendicular bisector.



c. A right triangle
In forming the perpendicular bisector, we have also formed four right angles which we can close to make four right triangles.

d. A circle of a specified diameter
Rope length must be one-half the diameter (the radius).



VISIT A FARM FOR THE FOLLOWING INVESTIGATIONS:

8. SILO ACTIVITIES

a. Measure circumference of the silo.

b. Calculate diameter from circumference $D = \frac{C}{\pi}$

c. Estimate height of the silo using shadow-stick method or the students may be given the height.

d. Calculate volume for the silo.

e. Weigh a cubic foot of silage and calculate capacity in tonnage.

f. Calculate number of days of feed given the rate of feed used per day of feeding.

g. Silage settles about 10 percent within the first 60 days after filling. What would be the height of the feed in the silo after 60 days?

9. CATTLE AND FEEDLOT PROBLEMS

a. Figure Feed — Example:
Twenty-five head of cattle are fed ten pounds of grain each per day. How much grain should be fed to the lot?

b. Feed Mixtures — Example: The cattle are fed a mixture containing 50 percent corn, 25 percent oats and 25 percent supplement and roughage. How many pounds of each should be mixed to feed the lot per day?

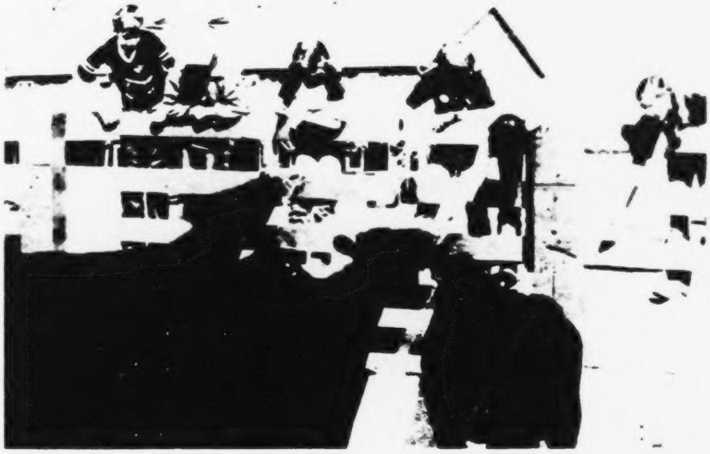
c. Figure the rate of gain — Example: The average weight of the cattle at purchase was 500 pounds each. After three months (91 days) the average weight was 818.5 pounds. What was the average daily gain?

d. Farmers need 1.9 feet of trough space per head of cattle in a feed lot. What length of trough space will be needed for the 25 head?

10. ESTIMATING

a. A good exercise in estimation can be performed at the hay storage barn. Count the number of bales in one layer and calculate the total.

b. The amount of hay can also be calculated by use of volume. Calculate the volume of one bale of hay and the volume of the barn. With this information, calculate the number of bales in the hay storage area.



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Explore, observe, experiment

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Bring science to life by liberating it from the classroom

BY ROBERT YAGER
AND JOHN PENICK

IF YOU WANT to improve your schools' science program, perhaps you should start at the beginning—by redefining what you teach as science. It's no coincidence that science—currently a top priority in many school systems intent on strengthening academic programs—is perceived by students as difficult or boring: In far too many schools, that's just what it is. As science educators, we know from experience that students become interested in science when they can relate what they're learning in class to everyday concerns that arise in the real world. We'll tell you about several successful science programs in a moment.

First, some background: Science often is defined as the exploration of the material universe, an exploration scientists divide into various disciplines. Biologists are concerned with life, geologists study the earth, astronomers observe the solar system, chemists study matter, and physicists study energy. With so many opportunities for arousing students' curiosity and interest, it's unfortunate that schools so often organize scientific information into predictable, prepackaged courses. Indeed, the classroom study of science usually is quite limited compared to what students *could* be learning outside the classroom.

Our message for school executives: Science can become an exciting, important part of the school program *if* you release it from the insulated and isolated world of the science classroom and if you expand your curriculum into the community. The best science programs build on real-world experiences, using community resources to help solve real problems. Most traditional science education programs, in contrast, all but ignore the real world and the components that make science exciting—exploration, observation and experimentation, and the testing of hypotheses.

Some schools do take advantage of the community and its many resources, and in those schools, we find students achieving at higher levels—accomplishing tasks, in fact, that usually are accomplished only by adults and science professionals. In such schools, students are eager to continue their study of science; they view science as a useful tool, rather than a stumbling block.

Here are a few examples of stimulating, successful school science programs that have broken out of the bonds of the classroom:

☐ The Green Acres School in Santa Cruz, Calif., once had a three-acre gravel parking lot. Today, the lot at this elementary school is green with fruit orchards and gardens and alive with farm animals tended by enthusiastic youngsters. Community leaders as well as teachers work with these elementary students on lessons involving nutrition, soil chemistry, produce marketing, animal husbandry, the proper care and use of tools, and so on. Students learn how to apply principles of science, mathematics, and social studies to their work with plants and animals. They learn firsthand such difficult cause-and-effect relationships as the effect of soil chemistry on a farmer's crop production, marketing success, and income. At Green Acres, science easily is the most popular course in the curriculum. And in some 65 additional schools statewide, the Green Acres model successfully is stimulating other kids' interest in science, too.

☐ Teachers at two Natrona County (Wyoming) junior high schools say their classrooms encompass the whole state. In fact, teachers and students built nature trails through various parts of the state, including a unique mountain trail for the blind (plaques along the roped, quarter-mile route are printed in braille). Teachers also conduct history classes on the trails—called "science-history loops." Week-long field trips along the trails become unique learning experiences with the help of supplementary information sheets developed by the teachers. Another example of science that gets young people in Natrona County involved in the world around them: As part of their science curriculum, junior high students meet with local community leaders to discuss policies and activities involving the local energy industry. Some students have presented their ideas at community meetings and before government bodies.

☐ At Seckman Junior High School in Imperial, Mo., Eva Kirkpatrick involved her ninth grade physical science class in investigating environmental protection issues related to the city's decision to build a garbage dump near a nature preserve. The unanticipated result: Students uncovered graft at city hall, participated in a court trial, and won the case. (The city spent $96,000 fighting the case, and the students spent only a nominal amount to photocopy documents.) These young investigators became local heroes while learning as much standard "science"—and a good deal more civics—than they would have using just the textbook.

☐ In Wallingford, Conn., Carol Wilson's high school students conducted energy audits for the school. They worked with school executives, the custodian, and state energy officials, becoming certified energy auditors themselves. As a result of their training in energy conservation, and with an investment of $12,000 from the school board, these students saved the school system some $260,000 in fuel costs the first year alone. Nine students involved in the project went on to become state-certified energy auditors and now are qualified to do some-

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Robert Yager, a former president of the National Science Teachers Association, and John Penick are professors at the Science Education Center, University of Iowa, Iowa City.

‘The best science programs build on real-world experiences’

Elementary school *science students at San Francisco's Yo Wick school save marigold seeds (above) for spring planting and water a flat of newly sewn seeds (left) in the school's "Life Lab." The soil mix used in the students' outdoor laboratory includes "Zoo Doo compost" donated by the San Francisco Zoo. At Green Acres School in Santa Cruz, Calif., youngsters study the composition of soil mixtures (below) using a microscope and a hand lens.*

thing they enjoy. The Wallingford energy audit program has been picked up by approximately 40 schools statewide.

We believe the message from these examples is clear: When the science program allows the discovery process to go on *outside* the classroom as well as inside it, students not only learn science concepts, they also learn to focus on the needs of their community and the nation. And they recognize that science is not something to be found only in books or on chalkboards, but in their daily lives as well. By taking science beyond the classroom and using your community as a laboratory, you give students a chance to learn what science *really* is all about—while you involve the community in making your science program a success. And by every definition, that is learning at its finest. ■

Connecting Patterns Through Environmental Education

PHILLIP JOHNSON

Neal Maine is the biology teacher I've always wished I'd had. "Education" means at its root "to lead forth," and Maine's classes at Seaside High School have been led forth year after year into the environment of Oregon's north coast. The students learn to ask their own questions about the ecosystems that have surrounded them all their lives—the streams, the estuary, the shore, the fir and spruce forests—or about problems facing the community. Their training in science comes as they learn how to pursue the answers, and to communicate their knowledge even as they learn.

For two years, Maine's classes, entirely on their own initiative, wrote, edited, and distributed the "Student Oceanography Newsletter," which went out to schools in 35 states. Seaside High students have produced slide shows on such subjects as forest fire management and the value of "snags" (standing dead trees) as wildlife habitat—shows that were subsequently presented at public meetings.

Maine's students often begin by studying salmon, one of the area's most valuable resources, whose decline is a cause of widespread concern. Often students become so fascinated by the streams or estuaries through which the salmon pass that, by following their own questions, they change their focus from the individual creature to the entire ecosystem. To these students, "biology" has little to do with facts memorized, tests taken, and experiments performed; it isn't merely a requirement to be checked off along a predetermined pathway to degree and career; it is a means of learning how the world works.

Yet Neal Maine is troubled about the effects of this form of education. His students emerge with a vision of a world composed of intricately related systems and cycles. They have an inkling that "biology," "chemistry," and so forth are simply different avenues to understanding a world that doesn't divide itself into neat categories. They have been led forth, and they are excited by what they have found. Then they return to those circumscribed human environments, the home, the school, the job, and find that this vision isn't considered appropriate. All too often they find that patient observation of systems and cycles and the knowledge that all things interrelate are incompatible with conventional academic subjects and economic goals and community attitudes. Providing an integrated education that will "unify the cubbyholes we all tend to stay in can create internal conflict and even family conflict," worries Maine.

Through environmental education educators can integrate all subject matter into the story of our struggle to adapt to a world we are forever transforming.

The Task of Modern Education

The world is beset by a wide range of threats to long-term ecological stability, and since stability and biological survival are closely linked, there is a case to be made that an essential task, perhaps the paramount task, of modern education is to prepare students to cope with these "environmental problems." The magnitude of the threats to the biosphere is great enough that there is urgency in the need for better education about the immediate dangers. And yet this education will have failed in its most important role if it treats the environment as an alien place where problems occur due to "human impact," and which may or may not encumber humankind with inconvenient "limits." The paradox is that to get to the root of our environmental problems, we must learn to see that the environment is not a separate subject at all.

We must begin with the world as we find it, though, and in that world the words "the environment" conjure up a parade of horribles. No reader of this magazine needs to be told that we are plagued by pollution, erosion, species endangerment, and the dwindling of the resources on which industrial society depends. But it is entirely possible for any intelligent person to feel inundated by the details—a PCB spill here, radioactive leakage there, the clubbing of baby seals somewhere else. It is entirely possible to gather, from the isolated incidents reported in the press, that "environmentalism" consists of sentimental concern over individual species and beauty spots, and to wonder sincerely whether the snail darter, the Furbish lousewort, the white-water stretches of the Stanislaus River, or the sagebrush plains of Wyoming are really vital to human well-being.

It is even possible, for those who aren't paying enough attention, to take comfort in the protestations of purblind technocrats that things are actually getting better: that urban airsheds are less polluted, that pesticides are adequately regulated, that fusion or fission or orbiting photovoltaic arrays will solve our energy dilemma.

What is missing here is a sense of the depth and pervasiveness of the threats to ecological stability. It must be understood that the cumulative effects of the behavior of one species—homo sapiens—are very close to reducing the capacity of the global environment to sustain that same species, and millions of other species as well. Just to make sure that we are all talking about the same thing when we discuss "the environment" as an issue worthy of the schools' attention, consider:

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"What is missing is a sense of the depth and pervasiveness of the threats to ecological stability."

- There are, roughly, some 10 million species of organisms on the planet at this moment, about 1.5 million of which have been scientifically identified. But this biological diversity is being rapidly reduced. Extinction of as many as one-fifth of all the earth's species is possible by the turn of the century, projecting current rates of deforestation, conversion of wild land to urban and agricultural uses, and other development. Mass extinction at this rate will almost certainly result in unpredictable alterations of global nutrient cycles (nitrogen, sulphur, carbon, and so on), the composition of the atmosphere, and soil productivity.

- Tropical forests are the planet's greatest reservoir of biological diversity, embracing from two-fifths to one-half of all species. A 1976 study indicated that tropical forests are being cut down at the rate of 42,000 acres per year around the globe. At this rate, half of all these forests will be gone in something over 50 years, but exponential population growth in tropical countries makes it likely that the rate of deforestation will correspondingly increase. The loss of these breathing, moisture-bearing, heat-retaining forests will alter the world's weather patterns, among other things.

- From one-fifth to one-third of the earth's tillable cropland is losing topsoil at a rate that is undermining its long-term productivity.

- No exact figures are available, but it is known that millions of acres have been transformed into desert through the impact of agriculture and forestry practices. Roughly six percent of the earth's surface is now considered desert, but another 28 percent is at risk of becoming so, according to one estimate. From an anthropocentric point of view, this would represent an overwhelming reduction of the global environment's food, fiber, and fuel needed to sustain our species.

- Hopeful eyes are often turned toward the oceans as a future source of food, but in reality most of the 30 or so common food species of fish are currently being harvested at levels beyond the yield their numbers can sustain.

Global Problems

This parade of grim realities could be a long one; we could go on to speak of acid rain and loss of estuaries and wetlands and the increase of carbon dioxide in the atmosphere and many more. What all these "environmental problems" have in common is that they involve the relationship of the globally dominant species—homo sapiens—to the global environment. They cannot be addressed merely through laws or political considerations or "marketplace" factors in any one country. They pose a distinct threat that within decades or a very few generations the earth may become a biologically more limited place, which would have obvious and dire implications for the species now perched precariously at the top of the food chain.

If these threats are acknowledged as real, no educational system hoping to prepare its students for citizenship in the world could fail to treat "the environment" as an important subject. Even if a more skeptical attitude is taken, future citizens must be given the tools to weigh environmental arguments.

But parading the horribles, as I have done, is part of the problem. It reinforces the concept of "the environment" as something apart from ourselves upon which we have "impacts" if we are not careful. It leads to the assumption that the "natural" and the "human" are separate worlds in collision, and that the task of environmental education is to assist us in keeping the former safe from the latter.

The immediate threats are real, I am well and truly convinced, but they all stem from the same root, that sense of separateness. What is needed in education is not a new item in the curriculum devoted to "the environment," but a new approach to the structure of knowledge. Rather than terrifying students about ecological disaster, the educational system should produce students who understand that the global environment is simply the way the world works, with humankind, as a globally dominant species, a very important part of that environment. That is a more hopeful, less paralyzing view of the world, and a profounder and more fascinating challenge to education.

Studying Patterns

If Neal Maine's students are unusual, it is primarily because their education has been integrated in a way that transcends separate categories of subject matter and instead takes its pattern from the environment. Instead of abstractions, they have learned ecosystems and cycles, and, just as important, they have begun to understand the ways in which they are active participants in those systems and cycles. They have begun to follow what cyberneticist Gregory Bateson calls "the pattern which connects."

Studying the pattern which connects should be the mandate of education for two reasons. First, because humankind, by means of its brain the most successful competitor among the planet's current burden of species, has penetrated every niche and habitat on the globe; this perfectly natural event has presented our species with the tremendous evolutionary challenge of consciously learning to adapt to a global environment. Current environmental problems are the symptoms of our failure to adapt thus far. Failure to learn in the relatively near future may well result in our extinction, or at least the drastic modification of our environment, another perfectly natural event that educators and other humans will nevertheless wish to forestall. Knowledge of the patterns which connect us to the rest of the global environment would thus be a precursor to our learning to adapt and central to any sane educational program.

Second, as we struggle to make this adaptation, the structure of our knowledge evolves as well. As the study of the pattern which connects, environmental education is actually the most appropriate model for assimilating new information in the sciences.

The Cartesian World View

The organization of the sciences, and in many ways of Western thought generally, lies in the Cartesian world view. The legacy of Rene Descartes was a mechanistic conception of the world, in which all matter was broken down into small, discrete building blocks and cause-and-effect was simply the direct impact of one unit of matter upon another. Only one thing stood apart from this mechanically operating material universe—reason, found exclusively in the human brain. And the ultimate use of this reason was to express the mechanical operation of the universe in mathematical terms; geometry was all.

The Cartesian world view came most obviously to dominate physics, but in reality it became the core of all scientific thinking. Just as physics was a search for the smallest units of matter, and the direct, cause-and-effect forces (such as gravity) between these units, biology became an effort to understand how the machine of life worked. The human body itself was conceived of as a machine whose function was to carry around the reasoning faculty. The fundamental principle of all the sciences became reductionism, the idea that the goal of science is to disassemble the machine into its constituent parts to see how they work individually.

It took a long time for the implications to sink in, but virtually all of 20th century physics has transcended the Cartesian model, beginning with Einstein's formulations making it clear that mass and energy are different expressions of the same thing. Physics pursued Cartesiansim to the reductionist end, and emerged on the other side with the revelation that there are no ultimate building blocks. The universe, from a physicist's point of view, can no longer be understood by breaking matter down to individual pieces and then building up laws of causation. Instead, quantum theory and statistical mechanics have introduced us to a universe that is basically a series of interrelationships rather than things. Nothing can be studied by itself; rather, nature is a web of interconnections, making possible non-local forms of causation unexplainable by means of universe-as-clockwork reductionism.

The "life sciences" have been very, very slow in moving away from the reductionist model. Our study of life on earth is still abstractly subdivided into "biology," "chemistry," "molecular biology," "biochemistry," "genetics," and even, as a separate discipline, "ecology." Our research funding and our most brilliant work still tend to go toward ever more reductive efforts to find the "building blocks of life," even while the ecosystems upon which life on earth depends wither unheeded outside the window. Except in certain classrooms in Louisiana, evolution is now understood to be a fundamental principle of biology, but evolution is all too often studied in terms of the reassembly of these building blocks into new organic machines, which will then begin to respond to an external "environment."

Still, as we have traveled far enough from ourselves to look back and photograph the earth as a whole, heartbreakingly alive and vibrant against the blackness of the interstellar deeps, the life sciences too have begun to see their subject as an entity, made up of interconnections rather than an accumulation of discrete parts.

Evolution is coming to be seen as something more than the competition of species against species, let alone of individuals within a species. Rather, evolution is a matter of constant feedback within and among species. As we come to understand that long-term ecological stability is a key to survival, the focus begins to shift away from "Nature, red in tooth and claw" toward such concepts as "group selection" and even "ecosystem selection"; it begins to appear that those groupings of species that optimize the chances for each other's survival last longest. (Recent work in paleoanthropology, which tends to support the idea that the key to protohumankind's success was its superior ability to cooperate, contributes toward this shift in thinking.) It is the totality of these interrelationships that makes up the environment.

The Gaia Hypothesis

The evolving shape of the life sciences can perhaps be seen in the "Gaia hypothesis" put forward by J. E. Lovelock, a British interdisciplinary scientist who holds degrees in chemistry, medicine, and biophysics. Lovelock and other scientists after him are thinking seriously about the primitive, pre-Cartesian concept of Mother Earth (the Greek goddess Gaia). Lovelock's idea, still clearly labeled a hypothesis, is that the interconnections of life are in truth those of a single organism or living system. Until very recently, it had not been explicitly recognized by many scientists—even though it is inherent in things that had long been known—that biological processes play a major role in such phenomena as the continually breathable gaseous composition of the atmosphere and the constant level of salinity in the ocean. The Gaia hypothesis takes this new understanding one step further, proposing that this constant creation by life on earth of its own environment is in some sense purposive, a meaningful process of monitoring and responding to such challenges as the cyclic changes in the sun's energy output.

This concept is far removed from the despairing notion of a problem-fraught "environment" placing limits on humanity. It emphasizes instead humankind's interconnections with the environment as a whole, restoring even war and industrial pollution—not to mention scientific research!—to their place as products of the "natural" environment. It hardly gives us a license for ecological abuse, since the extinction of an unstable species might well be the response of a self-regulating environment; but it does place the current parade of horribles in a calmer perspective and allow for humanity's creative if non-imperial function in modifying our environment. Playfully accepting Lovelock's hypothesis for a moment, we might even wonder if the development of an environmentally oriented curriculum in the schools might not be Gaia's strategy for correcting the excesses of her most rambunctious children.

True environmental education, then, should be about the pattern which connects. It can serve as a paradigm for teaching even at the earliest levels—perhaps especially there—and can lead to an integration of knowledge in which students understand that "biology," "chemistry," "ecology" and all the rest are subsets of the same study, and understand how these subject matters may apply to the environment and to their role in its continuing evolution. And environmental education is not merely a means of integrating subject matter in the sciences. Political science, history, sociology, and the arts can be thought of as different versions of the story of humankind's struggle to adapt to an environment it is forever transforming.

We urgently need better education about the state of our environment if we are to adapt and survive. But in order to adapt, we need not only to transform the world but to be transformed. The most important goal of environmental education should be to guide us from separateness to relatedness.☐

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'Enviro-Lab' Takes to the Waves

Project Oceanology students engage in a favorite activity—collecting, measuring, and observing lobsters.

David R. Scott

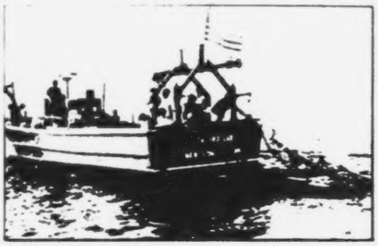
For the past eight years, secondary-school students in southeastern Connecticut have taken a field studies approach to what many of their families have done for generations—navigating the sea. But instead of setting sail in a Yankee clipper and returning with a hold full of tea or gold, as was once the custom, these students are sailing the waters around Long Island Sound in a rehabilitated Navy launch, and returning to shore with a fund of knowledge about the complexity of the marine environment.

Project Oceanology, as the program is called, is a cooperative effort of eleven public school districts and four private schools in and around Groton, Conn. Conceived in the 1960s by a group of teachers and administrators who felt that marine education was essential for a region with such close ties to the sea, the project had won the support of local boards of education, the University of Connecticut, and area businessmen by the time it received a $59,000 starting grant, in 1972, under Title III of the Elementary and Secondary Education Act. Since the initial grant, the project has become largely self-sustaining, though it still relies on outside funding for special activities. Project director is Howard M. Weiss, a marine ecologist, who is assisted by a small staff of marine educators.

Project Oceanology's ongoing objectives include:

- Emphasizing to students and area residents the potential and importance of Long Island Sound as a continuing natural resource;

All hands help to bring in the otter trawl (large net towed behind the Enviro-Lab).



Plankton collection involves pulling a fine mesh net to concentrate the plants and animals.

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Top, the cod-piece (narrow end of the otter trawl) is heaved aboard, full of marine life. Above, "levelometer" (really a set of parallel meter sticks) allows students to measure a cross-section of the coastal environment.

- Developing marine science curricula in biology, physical science, and chemistry, as well as resource materials at all levels;
- Developing effective liaisons between participating schools and project staff; and
- Training teachers in use of materials and equipment.

A boat and a laboratory

The groundwork for accomplishing these objectives was laid early in the project when a "retired" 15-meter liberty launch from the carrier *Wasp* was located by project staff and donated by the U.S. Navy. The Navy agreed to rebuild the launch's engine, while cleanup and outfitting of the hull were left to project staff and a volunteer crew of junior and senior high school students from participating schools. Rechristened *Enviro-Lab*, the boat was launched in April 1973.

At the same time, a base for Project Oceanology was established at the University of Connecticut's southeastern branch at Avery Point in Groton. A building on the water, with a large adjacent pier, was leased to the project to serve as a student laboratory and as dockage for the launch. The laboratory is ideally situated, with direct access to onshore habitats at Avery Point, a nearby coastal preserve, Long Island Sound, and the Thames River estuary. In addition, Millstone I and II, an on-the-water nuclear power plant in Waterford, Conn., is an hour's boat ride away, as are several local fishery operations.

Again, numerous hours were donated by students and staff to ready the building and pier for use. Local businesses and industries were also generous with donations of materials, and a state women's seamen's-friend society gave funds to purchase microscopes.

On the water

With many of the essentials taken care of, Project Oceanology was free to concentrate on its on-the-water capabilities. The program is currently structured so that participating schools may either choose from a multitude of trips pre-designed by staff, or they may tailor their own trips. A typical on-the-water session lasts two and one-half hours, with a maximum of 45 students and instructors using the boat during any one run. During the school year, the project operates daily from September through December and mid-March through June. Two programs are generally scheduled per day, with many schools opting to run programs consecutively for more efficient use of facilities. In addition, schools frequently combine a half-day of shore work with a half-day on-the-water program.

Depending upon the season, student activities may include: river and estuarian studies, work in the open sound, study of coastal processes, gull rookery studies, or a nuclear plant area study.

For example, one study last year involved several schools in a population study of the winter flounder. The fish were caught, measured, and fitted with a small plastic tag, and returned to the water. Their size, sex, catch location, and tag number were carefully recorded. Over the entire year, vital information was retrieved from recaptured fish. Final data, when fed to the University of Connecticut computer, helped students to understand the complexities of a real population—in addition to impressing upon them the time and patience needed to conduct meaningful research.

Beyond its regular operations, Project Oceanology offers an after-school marine studies program for students interested in pursuing further investigations; two 10-week classes meet in fall and spring. Also, for students drawn to research, a summer program is available in which small groups of students and instructors actively investigate such topics as: intertidal ecology of near-shore islands, marsh ecology, dynamics of scallop populations, and a history of lighthouses of eastern Long Island Sound.

The project also gives teachers plenty of opportunities to become "seaworthy." For example, it provides:

- An intensive teacher-training program in marine science education at Eastern Connecticut State College;
- A four-week summer program at Avery Point with studies into specific environments;
- Sea water and living marine organisms for classroom use (as well as assistance to teachers with experiments);
- Audiovisual programs on boat and shore programs and on coastal zone management;
- A loan service of equipment needed for field work and in-class experiments;
- A meeting place for educators interested in marine science.

In addition, Project Oceanology has developed a three-volume set of resources for school use, entitled *Investigating the Marine Environment: A Sourcebook*. The recently published resource details numerous experiments and techniques for both field and laboratory use, and includes a student text and a comprehensive teacher's manual.[1] Project staff are also working to develop classification keys to the plants and animals of Long Island Sound.

From the beginning, the project has sought to establish links to the community. To that end, activities are available to community and college groups on a charter basis after school hours and on weekends. The project also sponsors adult and community education activities throughout the year.

Setting policy

Project Oceanology is governed by a board of representatives which includes individuals (usually administrators) from each of the participating school systems, in addition to the project director and one teachers' representative. The board of representatives oversees the budget, which now exceeds $115,000. The financial contribution and number of on-the-water trips for each school district are assessed based on enrollment in grades 7–12. In addition to meeting periodically with the board, the project director also convenes regularly with a group of teacher representatives from each school building, who aid in disseminating information and in setting schedules.

Project Oceanology has exerted a dynamic influence on education in southeastern Connecticut, and has become a national model for marine science studies. Its impact is most obvious, however, in the enthusiasm displayed by the students who "follow the sea" each year, and return eager to see their field studies produce meaningful results. ■

Top, transect line and ¼ m^2 quadrat allow for systematic observation and counting. Middle, students indulge the senses while exploring the contents of the otter trawl, now removed to the wet tank in the stern of the Enviro-Lab. Bottom, back in the laboratory, students use keys to identify a specimen.

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[1] *Investigating the Marine Environment: A Sourcebook*, Vols. I-III, by Howard M. Weiss and Michael W. Dorsey, is available for $15 per three-volume set (includes teacher's manual) or $10 per two-volume set from Project Oceanology, Avery Point, Groton, CT 06340.

David R. Scott, a teacher at Clark Lane Junior High, Waterford, Conn., is also an instructor in Project Oceanology's summer marine studies program. (Address: 105 Clark Lane, Waterford, CT 06385.)

Current Practices

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OUTDOOR EDUCATION

FACT SHEET

DEVELOPING AN OUTDOOR EDUCATION PROGRAM FOR PUBLIC SCHOOLS

WHAT IS OUTDOOR EDUCATION?

Outdoor Education is education in the real world of the out-of-doors, where students are taken to a specific site and allowed to explore and observe its particular ecology. It is an extension of the classroom, rather than just a science or field trip, a first-hand study of nature and of the interdependence of all living things.[5] Briefly stated, it is education in, for, and about the outdoors. Outdoor Education is an effective way to develop students' knowledge and appreciation of their environment, to stimulate their curiosity, and to motivate them to learn.[7]

WHAT ARE THE FIRST STEPS IN SETTING UP A PROGRAM?

The first step is to bring teachers, administrators, and parents together to discuss establishing the program and obtaining the needed resources. Persuading parents is perhaps the key to the whole program, as they, in actuality, have the controlling say, since they decide whether or not their children will participate. Community involvement is the most important factor in establishing and maintaining a successful Outdoor Education program.[5]

The next step should be to work out a definite plan, with specific recommendations on site locations, topics of study, schedules for the school year, and estimated costs. This information is necessary to obtain funding from boards of education.[4]

WHAT TOPICS CAN BE TAUGHT?

Certain topics are especially suited to Outdoor Education. Biology and science--with the excellent opportunities for first-hand observations provided by an outdoor setting--are two. Geology is another, particularly in areas like the Southwest, where local topography is usually varied.[2]

Other, more traditional, classroom subjects may also be taught. Math can be incorporated into nature observations that require a tabulation and averaging of findings. Music can be taught, as students learn to make various instruments from natural materials they find in their explorations. Language arts is another possibility, as the outdoors provides inspiration for poetry and other creative writing.[7]

A wide range of special skills can be taught, from contour mapping to compass reading, all contributing to the development of the whole student-- mentally, physically and emotionally.[1]

WHAT IS A TYPICAL SCHEDULE LIKE?

Most one-day programs are scheduled around one specific topic. The day's activity might be charting local weather conditions, listing certain types of insects or animals, or examining various stages of tree growth, but there should be only one main focus for the day's program.[1]

The trip will usually begin from school in the morning. If the site is close enough, several hours will be available there for morning activities before a lunch break. After lunch, several more hours can be spent on learning activities before returning to school. Set up this way, the first half of the day might be devoted to exploration and observation, and the second half of the day to charting the findings.[1]

WHAT KINDS OF AREAS CAN BE USED FOR AN OUTDOOR EDUCATION SITE?

There are countless possibilities for Outdoor Education sites, such as gardens, farms, cemeteries, city parks and recreation areas, ponds, streams, forests, zoos, nature centers, fish hatcheries, and even garbage dumps. Such places provide students with an opportunity to explore the world around them.[7] Ideally, the site should be within a few hours' driving time. An appropriate site often exists within or near present school

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boundaries.[6] Depending on the type of site selected, the land may be purchased, if funds are available, or rented. In the case of state or federal land, it may be possible to use it at no cost, or for a small fee.[6] The site should have several types of topography or other unusual features, provide privacy and be away from densely populated areas, and have no hazards to the students' safety.[4]

WHAT SOURCES FOR FUNDING ARE THERE?

As part of the education curriculum, an Outdoor Education program, and any funding required, should be the responsibility of the local board of education. A careful, clear outlining of the benefits of the program and safety precautions that would be taken should be enough to convince the board. If they are unresponsive, several alternatives exist. Money is available from state Urban Education funds, federal ESEA Titles I & V, part C programs, and from private philanthropic and community service organizations.[4]

WHAT SORT OF ADMINISTRATIVE BARRIERS ARE THERE?

One of the possible obstacles to setting up an Outdoor Education program is the need to have flexible, modular scheduling of classes, so that all-day or half-day trips can be arranged with a minimum of disruption of regular classes. This requires a close cooperation between teachers and administrators, but can be simply resolved.[6]

Another concern is the problem of transportation to and from the outdoor site. Buses must be arranged for and consent forms sent home to parents to be signed. Again, administrators must be willing to stand behind the program to overcome this problem.[6]

Parents and administrators alike may be concerned about questions of legal liability for trips away from the school. An ERIC/CRESS publication on legal liability for adventure activities provides the information to answer these questions.[8]

WHAT KIND OF TRAINING IS NEEDED FOR OUTDOOR EDUCATION TEACHERS?

Most grade-level teachers need special training to work comfortably and confidently in the outdoors with students because the more casual and less restrictive outdoor setting requires a readjustment of the teacher's attitudes toward student behavior and discipline.[4] Internship opportunities for training in outdoor education are available through universities and existing outdoor education programs in 21 states; a directory of these is available from ERIC/CRESS.[3] Workshops and graduate programs concerned with Outdoor Education are currently offered at many universities around the country and more are springing up. Generally, these programs emphasize natural science, philosophy, and conservation, topics essential in Outdoor Education.[5]

WHAT OTHER INFORMATION IS AVAILABLE?

The references cited contain more in-depth information on all phases of Outdoor Education, as well as additional references. These publications may be found at your nearest ERIC microfiche collection.

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OUTDOOR EDUCATION

PLANNING A CLASS CAMPING TRIP

A well-planned class camping trip is a learning adventure which develops personal values and concepts, generates skills for lifelong learning, encourages group cooperation, and enhances knowledge of and appreciation for the natural environment. Good planning will ensure a successful and fruitful trip. This digest is intended to serve as a guide to help teachers offer this unique learning opportunity to their students.

What are the prerequisites for a class camping trip?

A successful class camping trip will take into consideration the purpose of the trip as well as the needs and abilities of the group undertaking it. Adequate planning based on these factors is a special function to be shared by the group and its leaders. The students, under the careful guidance and direction of their leaders, should determine the goals and objectives of the trip and identify ways to accomplish them. They will thus become committed from the outset to making the trip a success. Maximum involvement of each student, stimulated by the teacher's enthusiasm and nurtured by the teacher's ability to lead, will ensure an effective, as well as memorable camping experience.

What basic considerations are necessary in planning a class camping trip?

Although many types of camping trips are appropriate for educational groups, the one selected should incorporate specific features to match the group's requirements. Among the factors to be considered in deciding on the type of trip to take are the following:

- Characteristics of group members such as age, special needs, and special skills
- Purpose for which the camping trip is to be made
- Length of time the trip will last, including traveling time
- Distance to be traveled, mode of transportation, and destination
- Activities anticipated and support tasks to be performed
- Season of the year

Although longer trips can be planned around holidays, the most prevalent type of trip, and probably the easiest to plan, is car camping to a near-by site for only one or two nights. Car camping is convenient in that the students and equipment are transported to their destination by bus or cars. The group may either remain at that location for their activities or use their campsite as a base camp and take trips from there. Such a trip is easy to plan and organize around the factors presented above.

There are, however, numerous alternatives. For example, groups may consider a camping trip involving other means of travel such as canoeing, bicycling, backpacking, or cross-country skiing. Obviously, these types of trips require specialized skills and equipment. This means special consideration of the group characteristics factor.

What are some camping trip activities?

If a camping trip is planned with a definite purpose in mind, the activities will be dictated largely by the type of group planning the trip. If the group is a specific class (such as history, science, physical education, etc.) a particular grade or home room (such as 4th grade, 9th grade, etc.), or an outing club (such as canoeing, camping, etc.) then it will be unified by that factor.

If students help determine the goals and objectives of the trip, they will have a clear understanding of the educational purpose of the trip. Otherwise, there is a definite risk of lack of cooperation on the part of the students who feel the camping trip is merely an opportunity to get out of the classroom.

The philosophy of outdoor education definitely needs to be instilled in students so that they understand that a camping trip is a privilege and a special opportunity to enhance learning. Specific learning expectations are inherent in well-defined activities, which may be either structured or unstructured. Students may participate in the following learning experiences during a camping trip:

- Observe, identify, and/or collect specimens (leaves, flowers, rocks, etc.)
- View a natural site (canyons, caves, waterfalls, etc.). Visit an historical site
- Use a variety of camping skills (firebuilding, cooking, etc.)
- Participate in outdoor adventure activities (canoeing, rock climbing, rappelling, backpacking, etc.)
- Study the environment (desert, forest, water, etc.). Participate in a work project (trail building, soil conservation, etc.)
- View wildlife and its habitat

What sites and facilities are available for group camping?

Numerous sites suitable for a class camping trip exist. Among these are areas administered by the National Park Service, the state and county recreation and parks department, the Corps of Engineers and other river authorities, the Bureau of Land Management, and the National Forest Service. Others include privately owned or agency administered camps and privately owned farms and ranches. Many of the above have group camp sites available by reservation. However, if a large area is not available at an organized campground, the class can camp on adjoining sites in groups of 8 or 12 per site with an adult leader.

Facilities vary from no conveniences (primitive) to numerous conveniences such as picnic tables, grills, firewood, tent pads, restrooms, showers, potable water, electricity, open shelters, screened shelters, pay tele phones, etc. The trip leader should visit the site prior to the trip to determine the exact facilities available. The charge for site use varies from no fee to a fee per site or per individual; existing fee structures are quite reasonable. Camping guidebooks are available in many states and will be a valuable resource when planning the trip. They usually provide lists of campsites and note available facilities and/or conveniences.

How can groups be organized efficiently?

Once the group has identified the external parameters of the trip, such as purpose, duration, destination, etc., it is necessary to organize the group itself. A ratio of one adult to 8-12 students should be maintained, with a minimum of two adults for small groups. The total number of students should be no larger than can be handled safely and effectively for that particular age group. Consideration must be given to the activities planned as well as to the camping situation. A maximum of 32 students with a minimum of four experienced adults as camping supervisors is recommended.

The actual camping situation can also be organized. The participants may choose from options like the following:

- Camp in one group with the meals prepared for the entire group
- Camp in three or four separate groups of 8 to 12 members each. Each group would prepare the same menu to make meal planning and food buying easier
- Camp in three or four distinct groups, with each group planning its own menu. This plan works best with older campers who already have camping experience

When the group is subdivided, the individual camp sites need not be adjacent to each other. Otherwise, the tenting arrangement may be determined for the group as a whole. In all cases, it is imperative that duties be assigned in advance. Duties should be posted on a "kaper chart" which itemizes such activities as pitching tents, building campfires, cooking, cleaning up, planning and leading even campfire songs and programs, loading equipment, cleaning the campsite before departing, and others. If the students have been involved with the planning, the many duties necessary to have a successful camping trip will be evident. Each person will have volunteered (or have been volunteered by their peers, not by the teacher) to help in a specific activity. This establishes expectations that duties will be performed as arranged and agreed.

The supervising adults should assist the students with various chores. This provides both guidance and positive reinforcement of desired behavior. All campers need the opportunity to experience success in performing the various camping duties. However, one adult alone should be in charge of the trip and in the final decision-making position. All other adults should help carry out the activities and procedures as planned.

What plans should be made prior to the trip?

Detailed advanced planning is a key factor to a successful class camping trip. An effective and efficient way to plan is to utilize various checklists and "kaper charts" for duties. Students of any age are quite capable of making the majority of decisions if the areas of concern are brought to their attention. Initially, students may work in small groups to plan such items as menu, equipment needs, activity schedule, tenting groups, etc. Then, as the groups share their information with the entire class and decisions are finalized, the students become totally committed to the trip logistics and to the cooperation demanded of them as members of the class.

Obviously, some areas of concern are the sole responsibility of the teacher, but student involvement should receive a high priority. Thus, the following topics should be addressed either by the leader or by the class members with leader assistance:

- **Trip Goals and Objectives**: Determine the purpose of the trip and prepare a schedule of activities with a time line.
- **Camping Skills**: Review the necessary skills in class prior to the trip. These might include pitching a tent, lighting a gas lantern, canoeing, etc. In the field, under conditions that may be adverse, is not the best place to confront such needs for the first time.
- **Adult Leaders**: Adults who have camping experience and the necessary skills to lead planned activities are needed to support the teacher/leader. Possible sources are other teachers, teacher's aides, parents, local college students, members of local outing clubs, etc. A briefing/training session should be scheduled for this group, and attendance should be mandatory.
- **Travel Plans**: Transportation should be provided by the school because of liability. If private cars are needed, check on the liability issue with the school office. Then schedule the bus or cars, make arrangements for competent drivers, secure maps, plan a travel itinerary, assign students to specific cars if a bus is not available, arrange for the car shuttle if needed as in the case of a canoe trip, etc.
- **Camping Site**: Make arrangements in advance to reserve the camp

site. Find out exactly what facilities are available, what fees are charged, and what permits are required

- **Finances:** Participation fees need to be determined. These are based on estimated travel expenses, campground fees, food costs, and miscellaneous items. If students are paying part or all of the costs, they need to pay in advance. Forms should be prepared to record all payments and expenses
- **Weather:** Consider weather conditions, plan for possible extremes to prevent emergency situations, and have a contingency plan. To be best prepared, check with the most competent weather information service within 24 hours of the trip
- **Kaper Chart:** A kaper chart displays duties with corresponding names so that it is clear at a glance who is assigned what chore. This method enables the duties to be evenly distributed and gives every person specific responsibilities and opportunities. Possible duties, as listed previously, include pitching tents, gathering firewood, fire building, cooking, cleanup, evening campfire songs, evening campfire games/program, loading equipment, cleaning campsite before departing, etc. The chart could also show who tents together and who rides in specific cars
- **Meals:** Plan the menu and prepare a form that displays both the menu and a list of requested food items to prepare it. Include a staples and supplies list and an equipment list. Don't forget recipes and condiments
- **Equipment:** Categorized lists of equipment—personal (required and optional) and group—should be compiled. Group equipment includes camping gear such as tents, tarps, lanterns, etc., cooking supplies such as stoves, cook pots, spatulas, spoons, fire building tools, etc., clean-up materials such as dish pans, pans to heat water, etc., storage containers such as ice chests, water jugs, etc., and eating utensils such as plates, cups, forks, etc. Such group equipment will probably need to be borrowed if the school does not own any, but individuals are responsible for their personal gear
- **Safety:** The saying, "An ounce of prevention is worth a pound of cure," is worth serious consideration. Safety should be stressed in all phases of planning as well as on the trip itself
- **Emergency Plans:** The leader should have a list ofthe parents' home and work telephone numbers. Awareness of any medical restrictions, allergies, physical limitations and special medications is necessary. Camping equipment should include a fully equipped first aid kit, perhaps prepared by the school nurse or doctor. A specific adult with first aid training and/or certification should be placed in charge. Identify and write down emergency telephone numbers and the location of the nearest hospital or emergency clinic. An emergency plan should specify who will go with the patient and who will stay with the group
- **Group Rules and Regulations:** All possible rules should be discussed and agreed upon prior to the trip. They might include a desired dress code, the type of footwear appropriate, desired conduct, etc. Any of these can become an issue and should be confronted in advance. Students who do not agree to abide by these rules should not go on the trip. Some trip leaders choose to have their students sign a sheet acknowledging the objectives of the trip and the rules and regulations
- **School Policies and Procedures:** Check with school administrators regarding such items as administrative permission for the trip, the form to be used for parental permission, travel arrangements, use of adult leaders other than school personnel, liability, handling of the trip expenses, available equipment, etc. A list of all students making the trip, the travel itinerary, and the activity schedule, along with any other information requested, should be filed with the principal. Parents should also be apprised of the objectives of the trip, the activity schedule, and the travel itinerary

What follow-up activities can make use of the camping experience?

Since the camping trip has educational goals, every effort should be made for the classroom teachers to use various aspects of the camping experience as a follow-up. It can be used to enhance learning in the various curriculum areas, i.e., language arts, science, history, physical education, etc. Even teachers who did not accompany the group can relate to the experiences in a positive way if they are informed of the details of the trip.

Other possible follow-up activities include the following:

- Cleaning and returning all equipment
- Writing thank you notes to those who assisted in any way
- Obtaining a written evaluation from each adult helper. Preparing a written report, one from each student of specific activities and insights and perhaps a trip critique

The trip leader should definitely compile a summary report to document the trip and to help plan future trips. It could contain the following lists and information:

- Trip objectives
- Names of students who made the trip
- Names of adult leaders, along with their addresses, telephone numbers, and responsibilities
- Travel itinerary and activity schedule
- Total trip costs: travel, food, campground fee, and miscellaneous expenses
- Addresses and telephone numbers of campground, sites visited, etc
- Copies of all forms and lists used
- Conclusions drawn from evaluations of adult helpers and students
- Notations on positive aspects of the trip
- Problems encountered and ways to avoid them in the future

Where may additional information on planning a camping trip be obtained?

The potential benefits of a class camping trip are limitless when adequate planning takes place. To help plan a successful trip the following resources are suggested.

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OUTDOOR EDUCATION

Digest — 1984

OUTDOOR EDUCATION ACTIVITIES FOR ELEMENTARY SCHOOL STUDENTS

Why is there a need for outdoor education in elementary schools?

Outdoor education is an informal method of teaching and learning which offers opportunities for elementary school students to:

1) participate in direct laboratory experiences for the identification and resolution of real life problems;

2) acquire skills with which to enjoy a lifetime of creative, productive, and healthful living;

3) attain insight into and appreciation for human and natural resources; and

4) bring children back in touch with those aspects of living where their roots were once firmly established. (Staley, 1979)

The purpose of outdoor education is to enrich, vitalize, and complement all content areas of school curriculum by means of first-hand observation and direct experience out-of-doors. (Skliar, 1974)

Outdoor education provides all students, regardless of intellectual abilities, with the opportunity to learn about and to appreciate their environment. They can also learn to protect and preserve it. Earth has many non-renewable resources. If children are taught to observe, classify, and explore these and other areas of the outdoors, they will develop a better understanding of these resources and be able to live in harmony with the environment.

Through outdoor education, then, students' perspective of the world as a big "out there" is altered to a view of the environment which values its pattern and organization as well as its beauty and function. (Williams, 1982)

What content areas can outdoor education cover?

Outdoor education can cover the whole spectrum of education from art to zoology. Teachers should not limit themselves to science experiences outdoors but should incorporate as many content areas as possible. Content areas may include language arts, social studies, science, health, math, art, or music. By integrating the outdoors into all areas of the curriculum, teachers have an opportunity to use natural teaching materials and to bring meaning to the outdoors. Teachers have the paramount opportunity to incorporate the outdoors in numerous content areas and to use the school grounds regardless of their locale. All school yards can afford some learning opportunities. They provide first-hand experiences with natural phenomena while encouraging flexibility to incorporate all areas of learning to achieve the goals of education.

What do I do first in outdoor education?

Begin analyzing the room or building in which you are standing. Most materials that you work with as a teacher every day come from our environment's natural resources. Nature functions as an interdependent scheme of which human beings are merely a part. The history and development of the school itself provide an excellent study showing our participation in and dependence on the natural world around us. (Skliar, 1974)

What are some activities which can be adapted to any grade level and content area?

The following is a brief outline of a few suggested activities; the teacher and the students together may generate even more ideas.

Activity: On a sunny day, mark the shadows of different objects at 9:00 a.m., at noon, and at 3:00 p.m. Any open area with shadows on the school yard is a suitable location. This activity may be correlated to subject areas as follows:

Language Arts: Use your imagination to write a fantasy about shadows. Include a description of how a shadow changes with the season (e.g., winter shadows are longer than summer shadows).

Social Studies: Discuss sundials and calendars as used in early civilization. Are they still used today? Have you seen any?

Science: Discuss how the position of the sun affects the sizes of shadows. For example, note the difference in sizes of shadows and position of the sun at lunch time and supper time.

Health: Examine changes of the pupil of the eye in shade and sunlight. Discuss how the sun can affect skin pigment.

Mathematics: Calculate the height of a telephone pole or a tree by measuring its shadow. Using a watch, calculate how long it takes the shadow to move a foot in distance.

Art: Construct a sundial and see whether it works. Sketch an object and include its shadow. Do this at different times of the day and year.

Music: As an object or a shadow, do interpretive dances. Play shadow tag to music. (Green, 1980)

Activity: Collect a variety of insects, snails, worms and other animals. These may be found in early fall and late spring underneath and in bushes on landscaped areas of schoolgrounds, in open grassy fields when weather is warm and sunny, and underneath a board or log placed on a grassy area. This activity may be correlated to subject areas as follows:

Language Arts: Read **Charlotte's Web.** As a literary spider, write a plan for catching a fly.

Social Studies: Select an insect or animal you found and describe how it affects the lives of people. Easy ones are bees, worms, flies, and spiders.

Science: Collect and identify the different stages of the life cycle of specific insects. Try to identify the life stage of each insect that you collect.

Health: Identify local specimens which could be classified as dangerous to human health and explain how they might be dangerous. List things that insects do which are of benefit to people.

Mathematics: Weigh each specimen collected and count the number of legs; calculate which specimen carries the most weight per leg. Trace insect movement on paper, and measure distance traveled and rate of travel; identify the speediest insect and the slowest insect.

Art: Discuss the colors, lines, shapes, textures, and designs seen in the insects, worms, snails, and other animals collected. Use these as ideas for drawing and painting.

Music: Create a sound composition imitating as many insect sounds as you can. (Green, 1980)

Activity: During any season, focus attention on the flagpole for purpose of correlating to subject areas as follows:

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Language Arts: Examine the Pledge of Allegiance carefully. Determine an appropriate synonym for each word; rewrite the Pledge using the synonyms you like best.

Social Studies: Investigate the history of the American flag. Who created the design? When was it first used?

Science: Has the flagpole been affected by the weather? Explain why or why not.

Mathematics: Estimate and then measure the height of the flagpole. Guess and then measure the circumference of the flagpole. Make sundial marks on the school grounds using the shadow of the flagpole at different times of the day. For a challenge, calculate the volume of the flagpole.

Art: Investigate the design transitions of the American flag. What major designs were considered?

Music: Learn to sing the "Star Spangled Banner." Discover the history of our national anthem. (Green, 1980).

Activity: The school parking lot offers a potpourri of learning activities which may be correlated with subject areas as follows:

Language Arts: Choose five license plates on cars in the parking lot. Write down all the letters in each license plate and see how many words you can compose using only these letters.

Social Studies: Which states are represented by cars in the parking lot? Using an atlas, find how many miles, by car, it would be to that state's capital city from your school. Discuss different kinds of parking structures — car elevators, ramps, etc.

Health: Make up safety rules for the parking lot. Explain the ways in which insufficient parking space tends to affect the behavior of people. Pick up litter in the parking lot. Use the litter to determine facts about those who park there (i.e., what they eat or read, etc).

Mathematics: Estimate in feet the length and width of the parking lot; use measuring tapes or sticks to determine its length and width. Compare the results. What is the number of square feet in the parking lot?

Art: Observe automobiles passing the school building or parked by the building. Determine the most common color of automobile observed. Design a car using basic shapes and different colors.

Music: Compose and/or perform a song or rhythmic reading on a day in a parking lot's "life." (Green, 1980)

Activity: During fall or spring, lie on your back in an open, grassy area and watch the sky on a partially cloudy day. Correlate this activity with subject areas as follows:

Language Arts: Think of as many adjectives as you can which relate to clouds, and write a descriptive paragraph about clouds.

Social Studies: What effects of the clouds can you see around you? Discuss the effects of clouds on areas of your state and on the people living in these areas.

Science: Spot and identify different types of clouds. Predict weather changes from clouds and their speed of movement. An excellent cloud chart for weather forecasting may be obtained from Downeaster Manufacturing Company, Inc., 574 Route 6A, Box 925, Dennis, Massachusetts 02638. Order model WFC, $3.00 each.

Health: Discuss the effects of cloudy versus sunny days on your moods. Discuss how different types of weather affect your work performance.

Mathematics: Estimate the size and speed of clouds by comparing with stationary objects on earth or by measuring the time it takes for the edge of a cloud shadow to pass two points on your school yard.

Art: Sketch a cloud whose shape you particularly like. Did the clouds change their shape while you were sketching?

Music: While you watch the clouds, listen to a cassette tape recording of portions of the Grand Canyon Suite. Does any part of the music match the clouds you see? (Green, 1980).

Activity: From a position near bird feeders or shrubs and bushes, observe the movements of birds for 10 minutes. This activity may be correlated with subject areas as follows:

Language Arts: Use library resources to discover which birds in your area migrate. Where do they go? How long does it take them to get there? Learn about bird banding. Describe the birds you saw, using as many descriptive words as possible.

Social Studies: Describe some activities of birds that are similar to human activities. Are birds helpful to people in any way?

Science: Identify and classify the birds you observed.

Health: What foods do birds eat that we eat also? Which birds do we eat? Which of the four food groups do birds belong to?

Mathematics: Make bird food for the feeders. Have the class do comparison shopping for ingredients. Learn how to measure ingredients for recipes. As a further challenge, convert the recipe measurements to the metric system.

Art: Make a kite shaped like a specified kind of bird (one that glides) and see if you can get it to fly.

Music: Listen to the sounds and songs of the birds you observed, and try to distinguish the different sounds they make. For further information listen to a record about bird calls. (Green, 1980).

By pursuing these and similar outdoor educational activities with their elementary school students, teachers not only educate but also provide a life-long appreciation of and respect for the natural environment, both esthetically and practically.

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How-To-Do-It

An Interdisciplinary Approach to Forestry Education

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Forestry education can emphasize the use of outdoor and indoor experimental skills, guest speakers, and even debates. A forestry minicourse can be interdisciplinary, exciting, and process-oriented—a delightful and memorable experience for students.

This forestry minicourse is studied for four to six weeks by my junior high life science class. The course features topics from language arts, law, history, sociology, mathematics, art, and woodworking in addition to botany, zoology, genetics, ecology, and evolution.

The course is adaptable for use in any outdoor and/or indoor classroom, with any age group. Indeed, parts of it have been modified for presentation to my non-science majors at the college level. The objectives of this minicourse are to:

1) expose students to field and classroom activities designed to develop analytical thought;
2) make students aware of and concerned with the benefits of a forest;
3) provide a basis for decision-making concerning future uses of forests;
4) relate forestry education to learning in other subjects; and
5) prepare students for possible future political action regarding the search for a balance between saving forests and cutting them down.

The student study is divided into five phases: tree-ring analysis; forest history; seedling competition; genetic improvement and cloning; and a forestry debate.

Tree-Ring Analysis

Students start the forestry unit with an activity designed to introduce them to tree anatomy and growth while causing them to experience the excitement of scientific discovery. They compare tree growth in hardwoods and softwoods by studying growth rings through pencil tracings (fig. 1). White paper is attached across the diameter of a sawn stump or fallen log with thumb tacks. The pattern of growing rings is traced by running a pencil to and fro against the direction of the rings.

Pencil tracings are done for several stumps or logs, both in the same and different forests. We first work within the hardwood section, then in a stand of white pine (*Pinus strobus*). Within each forest, the environmental conditions surrounding every naturally occurring stump are studied and recorded, including estimated soil drainage, topography, distance from other trees of the same or different

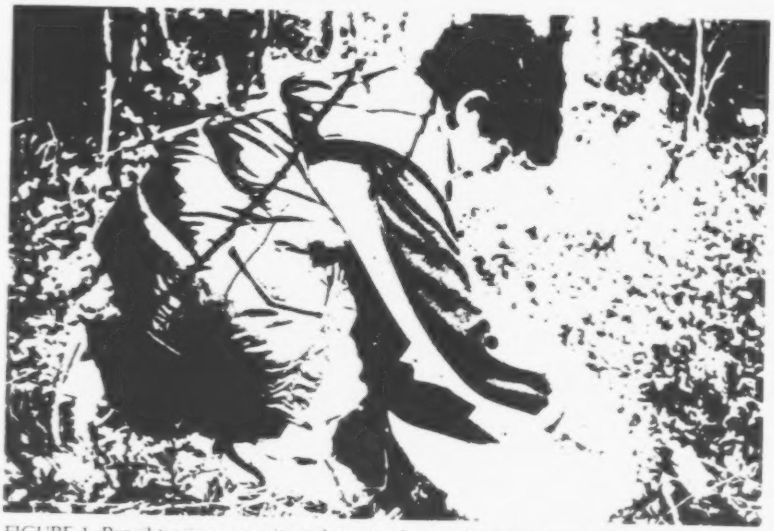

FIGURE 1. Pencil tracings permit students to observe firsthand how environmental conditions affect growth of wood. (All photos by the author.)

FIGURE 2. Increment borer obtains radial wood samples from the same tree species in different habitats and different species in the same habitat.

species, and whether the tree had grown near a stream or in an open, sunlit area. Advanced classes could also estimate the degree of canopy coverage, density, relative density, dominance, and relative dominance per species if the study is done in the spring.

Tree rings can also be analyzed by using an increment borer (fig. 2), available from forestry supply houses. This instrument extracts a thin core of wood from any standing tree. The rings are then counted without having to rely upon felled specimens. Cores should be removed as close to the base of the trees as the instrument handle will permit.

Following removal of the borer, the wood should always be painted with tree-wound dressing as a precaution against invasion by insects or fungi. Cores may be stored in polyethylene tubing or large-diameter soda straws for later comparison with pencil tracings of cross sections of the same tree species in the same woodland. Students may attempt to match the growth-ring records obtained in each method. This is known as cross-dating.

Cross-dating is a method of dating long dead wood (trees, posts, and structural beams) by comparing the ring patterns in the older wood with the patterns in living trees. Such dating is based on the fact that there is a variation in ring size from one ring to another. Examination of a number of wood samples from a given area reveals that variation in ring sizes appears to follow a pattern. If the same pattern can be identified in two pieces of wood, the age of one of which is known, then, by using the pattern common to both pieces, the second piece can be dated.

Use of this method in the Southwest has enabled scientists to establish continuous ring records of more than 6,000 years. With such records, they have determined when trees used as structural beams in ancient Indian cliff dwellings such as Mesa Verde were cut. Cross-dating has also permitted historians to date locally obtained wood more than 100 years old, such as that used for structural beams in buildings constructed by early settlers. Cross-dating can likewise be a useful tool in working with short records from more recent samples of dead wood. For example, cross-dating can be used to determine when a tree was killed by recent but unrecorded floods, fire, or other events (Fritts 1972).

A 30-minute, 16mm film entitled, "How Old Is Old?" (Time-Life Films, Inc., 100 Eisenhower Drive, Paramus, NJ 07652) describes how tree-ring dating and modern technology have made it possible to date objects more precisely. The tree-ring dating portion of the film will reinforce concepts learned during the pencil-tracing and/or core-sampling exercises.

History of Our Forests

This is an excellent time to describe (or have students write papers about) the history of human attitudes toward our forests. Students may complete a questionnaire (available from the author upon request) which evaluates their attitudes toward forests by asking a question made famous by television and magazine ads sponsored a few years ago by the Boise-Cascade lumber company: "What do *you* see when you look at a tree?"

Such a question readies students for the ensuing historical discussion which includes the local picture as well as the national situation. For nearly three centuries, the attitude that dominated American thinking was that the faster forests could be cut down, the better (West 1978).

Today's forest manager plans for the future as well as the present. America's forests were created with no help from humans; but what has been learned about various aspects of forest growth now makes it possible to obtain better yields of desirable timber in a shorter period of time than is possible in a natural, untended forest. The objective of forestry today is sustained yields of trees as opposed to the harvesting of a one-time crop.

Seedling Competition

This indoor lab activity is designed to show that growing plants, whether trees or vegetables, compete for various environmental needs. Since density of seedlings

FIGURE 3. Students prepare to plant pea (*Pisum sativum*) seeds in three milk cartons at three different densities to study which density promotes most rapid growth. Such studies of plant competition for niche space underscore ecological and evolutionary concepts.

influences their growth rates, students should experience thinning a population of growing plants in several different ways to observe which method promotes the fastest growth of the seedlings.

For this lab, the growth rate of several varieties of pea (*Pisum sativum*) can be observed to better understand which techniques the lumber industry uses to promote the fastest growth to satisfy our need for wood and paper products.

Each student's goal as a "forester" during this lab is to grow a "crop" having the most seedlings measuring over ten centimeters in height within two to three weeks. To accomplish this, the members of each group decide if, when, and how to thin out some of the seedlings to encourage rapid growth of the others (fig. 3). Students should compare the percent of seeds germinating and rates of growth of their variety of pea with the comparative germination achieved by all varieties used by other groups (fig. 4). The graphed results of this lab teach students not only which density of plantings promotes the best growth in the shortest time, but also which thinning plan is the most desirable (fig. 5). Procedural details of this activity are available from the author upon request.

Genetic Improvement and Cloning

Because the growth of different genetic varieties of peas are studied during the above investigation, students observe firsthand how various traits can be artificially selected by humans. Moreover, since the students have previously studied concepts germane to natural selection and evolution, all of this leads naturally to class discussions, films, and demonstrations of past and current research pertaining to timberstand improvement including grafting and cloning.

Both of these methods of producing "supertrees" have their critics. For this reason, an expert such as the school's industrial arts teacher speaks to the class about the modern lumber industry, with special emphasis placed on processing of "supertree" wood (fig. 7). After showing students some of the ways wood is cut in the lumber mills, a demonstration of the ease with which so-called "supertree" pine boards can often be cracked with bare hands is very effective.

Some plant geneticists believe it will be difficult to improve on what Nature has already provided genetically in the coniferous forests of the Southeast and Northwest. They contend that the best genetic strains developed naturally through slow, gradual adaptation to different soils and microclimates. Foresters are also worried about forests filled with genetically identical trees, which could be devastated by a disease or insect infestation (Mitchell 1974; Spurr 1979; Waring and Franklin 1979).

This is no small problem, especially when one considers the enormous demands we place on our forests. For example, each Sunday edition of *The New York Times* requires the cutting of 153 acres (61 hectares) of loblolly pine (*Pinus taeda*), and all the paper cups, napkins, and bags used by McDonald's for its fast food business gobble up 315 square miles (788 km^2) of such forest annually, according to the narrator of the film described below.

FIGURE 4. Student measures height of three varieties of pea seedlings planted in test plot. He then will compare the percent germination of his with the germination of the same and other varieties in this plot.

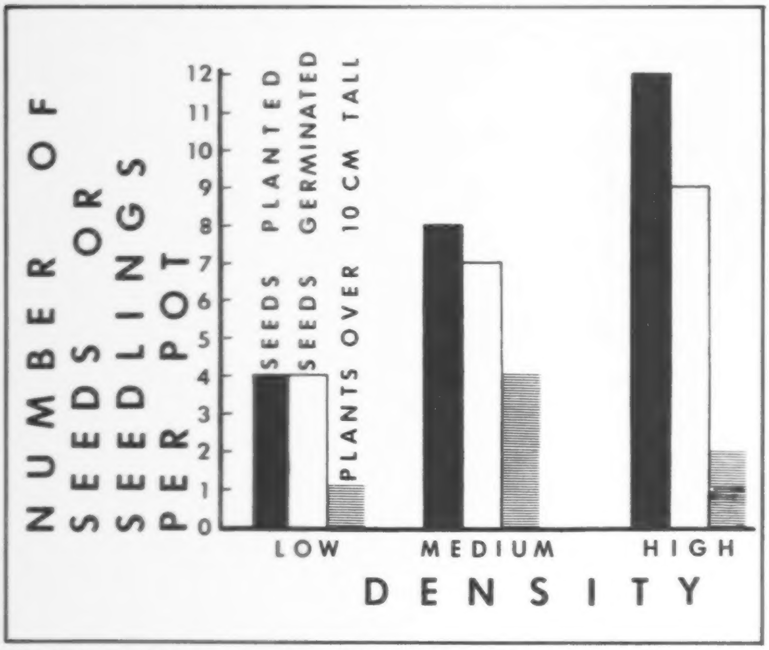

FIGURE 5. Graph showing the effects of different planting densities on germination success and growth in pea seeds during a three-week period. Data gathered from several students.

Forestry Debate

Students might arrange a debate centered around modern forest management. The 60-minute Time-Life film, "The Renewable Tree," discusses such management in light of the four timber-cutting methods used by the lumber industry today. The methods are:

1) shelterwood cutting, where trees are removed at several stages of development to provide sunlight, room, and promotion for new seedlings to grow;
2) selective cutting, where the most mature trees are selected for removal;
3) seed-tree cutting, where 10% of the best seed-bearing trees are left on the site to provide the seeds for the next crop of trees; and
4) clearcutting, in which all the trees, bushes, and shrubs in a block of 100 acres (40 hectares) or less are cut, both those that are commercially valuable and those that are not.

Prior to the debate, students are exposed to varying viewpoints depicted in the film and during a classroom demonstration of erosion. The erosion demonstration consists of two planting trays in which pea seeds have been planted three weeks prior to this discussion. After "clearcutting" the seedlings from one tray with a knife or razor blade so that the roots are left intact in the soil (the other "control" tray is not tampered with), the two trays are elevated at the same angle to simulate the type of mountain slopes on which clearcutting is performed. Students then pour "rain" into the upper end of each tray simultaneously, and collect the runoff at the lower ends into plastic containers located in a sink (fig. 8). Students not only observe the quantitative difference in volume of water runoff between the two trays, but also the quantitative and qualitative differences in soil sediment carried away. The famous field work on clearcutting and erosion by Bormann and Likens (1979), featured in the film on renewable trees, is reinforced by this demonstration.

The debate itself takes two or three class periods to complete. Students debate not only the clearcutting issue relative to other timber-cutting methods, but the recent desire of the lumber industry to gain permission to cut old redwood (*Metasequoia glyptostroboides*) stands in preserved areas (Jones 1978),, as well as whether the industry should be allowed to clearcut trees in our national forests (DeGraff 1978; Eskridge 1978). Each team of two to three volunteer debaters selects which side of the issue it wants to represent. The debaters then carefully plan their arguments.

Another approach is for students to conduct research for the debate without knowing which side of the issue they will be representing until told by the instructor just prior to the debate.

Evidence in the debate should consist of interviewing student "witnesses" and guest experts on wildlife and forestry, in addition to the use of visual aids such as bulletin boards and charts or maps if the debate is conducted indoors (fig. 9). Other class members finally grade each debater along with the instructor, using anonymous evaluation forms. These forms, as well as the details of the environmental debate process, are available from the author upon request.

Other Activities and Interdisciplinary Studies

Since a portion of the forestry minicourse hinges on student appreciation of the cloning method, you might order kits for cloning geraniums, ferns, and other species from Carolina Biological Supply Company, 2700 York Road, Burlington, NC 27215; or Plant Cloning Systems, Inc., 855 Narragansett Parkway, Warwick, RI 02888.

We are all consumers of paper products. This fact can be easily integrated with the forestry course to provide a relevant class discussion centered around recycling paper and solid waste management. Our school and community have gone beyond the discussion stage by initiating paper recycling boxes in every classroom. These are periodically exchanged for cash at our local municipal building. The money helps fund student government projects for the needy. Every spring such bundles of paper are exchanged for pine tree seedlings that students can plant at home. This is an excellent idea for Arbor Day. Community involvement by students is also exemplified by shade tree beautification projects such as flower plantings along the town's main street.

Social studies concepts are not just covered during the forestry debate or by studying the history of human use of forests in America. Few people realize, for example, that most of America's forests are not producing sufficient wood. We must import wood to satisfy our present needs.

In addition, when projecting our future wood requirements, the U.S. Forest Service appears to ignore our potential of becoming an exporter of wood and paper. This would greatly ameliorate our international balance of trade, especially since such trade has been liberalized through ratification of the Multinational Trade Agreement in 1979. These plus other social studies-related issues can be fruitfully discussed during the debate, along with possible techniques and strategies to resolve such problems.

Students are always interested in the bizarre. An excellent spinoff activity, therefore, is to assign *The Secret Life of Plants* (Tompkins and Bird 1973) as supplemental reading. This book describes many so-called "observations" purporting to show that plants are capable of secret, as yet inexplicable, powers such as mindreading. The book devotes much space to the work of Cleve Baxter, the polygraph expert who allegedly provided evidence for some of these powers of plants.

Lead a class discussion about this "evidence." Then have students read Galston and Slayman's (1979) refutation of it. Follow that with the showing of still another Time-Life film, "The Green Machine." This 16mm film provides a review of everything from the chemistry of photosynthesis to a detailed analysis of plant growth. It also astounds students with its coverage of Baxter's work as well as that of a little-known theologian who obtains consistently better growth by talking kindly to plants, even when control and test plants are locked behind glass to eliminate any possibility of carbon dioxide-induced growth biases.

After showing the film, suggest a research project such as "The Effect of Music on Plant Growth." This controlled experiment tests whether pea plants grow better under the influence of soft music rather than harsh music at the same volume. The procedure of such an investigation is available from the author upon request.

A final reading assignment might include Richard's (1973) paper on the plight of tropical rain forests in the face of human-caused destruction, during both war and peace. Discuss the pros and cons of this destruction from both points of view—the trees (and indeed the entire globe due to an increase in the greenhouse effect), and the humans who depend on them (Sagan 1980). We have done this in the form of another debate.

Do not overlook the potential for discussion of forestry careers. Silvicultural research in the past, present, and future should be spotlighted. This is elegantly done by Spurr (1979). After this, have a county or state forester speak to the class about the necessary training and background for such careers. If possible, obtain both male and female speakers to generate greater interest and to emphasize career potential for all class members.

Conclusion

The student debate climaxes the forestry minicourse which, above all else, forces students to think—think about how wonderfully structured trees are; think about their renewability when utilized wisely; think about their economic benefits;

FIGURE 6. Industrial arts teacher speaks to class about the lumber industry, particularly the strength of "supertree" wood compared to ordinary wood.

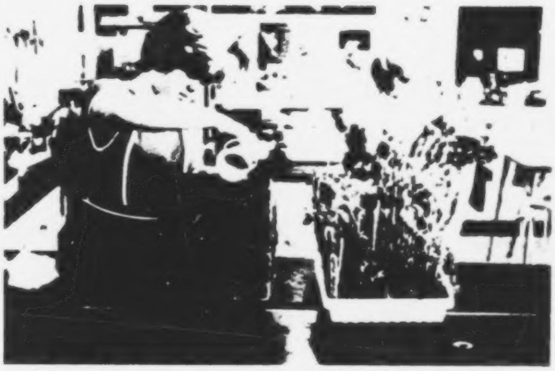

FIGURE 7. Soil erosion demonstration shows how both volume of water runoff and amount of soil sediment in that runoff increase after clearcutting. Test plot on right represents the control "stand" of tress on a similar mountain slope at almost the same angle of elevation.

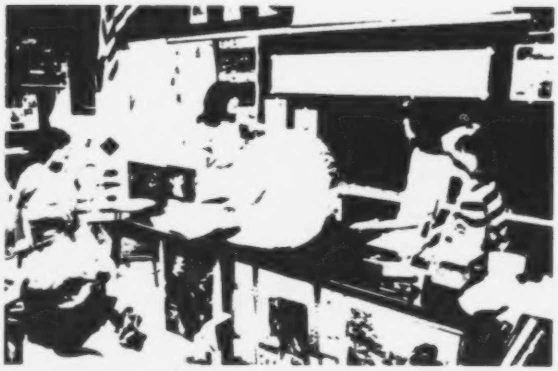

FIGURE 8. Teams of students debate the effectiveness of thinning a stand by using wall displays and a cross-section of oak.

think about their recreational opportunities; think about their protection and food for wildlife; and think about their protection of our watersheds. Too many students are not required to consider such aspects of their environment, their place in it, or their responsibility for it (Zipko 1977; 1978a and b; 1979; 1980). They are the future voters who will be called upon to either support or block programs designed to improve their environment. Not knowing what the issues are and not thinking about them will be tantamount to voting against that environment which we teachers should be motivating students to love and respect. The environment already has too many enemies; let us not add apathy to the list, either on the part of students or teachers.

What do *you* see when you look at a tree? More important, what do your *students* see?

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Note: Free materials about forests may be obtained from:

American Forest Institute
1619 Massachusetts Avenue, N.W.
Washington, DC 20036

California Redwood Association
1 Lombard Street
San Francisco, CA 94101

St. Regis Paper Company
150 East 42nd Street
New York, NY 10017

Western Wood Products Assn.
1500 Yeon Building
Portland, OR 97204

Weyerhaeuser Company
Office of Resource Education
Tacoma, WA 98401

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ELF Opens the Door

Jenepher R. Lingelbach

Slightly stooped, neck and head protruding awkwardly forward, the second-grader tiptoes across the floor in front of his attentive classmates. Suddenly he stops, cocks his head, and stretches his chin out, then rapidly tucks it in, sticks it out, and tucks it in again. A few more steps, pause, chin out, in, out, in. "A woodpecker," someone calls out, "a woodpecker pounding on hard bark trying to get insects in the tree."

This classroom is engrossed in a pantomime game from an ELF workshop entitled "Thorns and Threats." What is ELF? It is a basic natural science/environmental education program for elementary aged children. Designed by the Vermont Institute of Natural Science in Woodstock, Vermont, the goal of ELF is to give children experiences from which they can gain an appreciation and understanding of the way the natural world functions. Appreciation leads to caring. Understanding engenders a sense of responsibility for the environment. ELF is Environmental Learning for the Future.

Awareness, discovery and excitement are precursors of a scientifically curious mind. ELF takes advantage of children's natural curiosity and concern about the plants and animals around them. Using a workshop format with sequential activities, the children are led from initial introduction to knowledge and hands-on experience with the subject. There are over 50 workshops which are divided into concept groupings: Adaptations, Cycles, Designs of Nature, Forces of Nature, and Habitats.

In the aforementioned Thorns and Threats workshop (concept: Adaptations), the children watch slides showing defenses common to plants and animals: hard coats for turtles and trees, prickers for porcupines and rose bushes, etc. Then they play a concentration game with one team trying to match specific defenses with appropriate animals, while the other matches the same defenses with the correcct plants. On to the pantomime game where each child in turn acts out a situation in which he either uses defenses or tries to overcome them. "Pretend you are catching a slippery fish." "Play possum." "Pretend you're picking blackberries in a prickly patch." The children throw themselves into the acting with great energy and imaginaton; their classmates are quick to guess the scene. Outdoors, they look for plants with "don't eat me" defenses and finish the session back indoors by drawing a "monster mouthful" — an imaginary plant/animal which has such pefect defenses that no one can eat it.

What did these children learn? That plants and animals need defenses to keep from being eaten. That nature seeks deterrent methods to avoid wasting energy in battles or injury. That totally unrelated organisms may use similar strategies because those strategies work. These could be difficult concepts to explain to second graders.

In order to provide a setting in which children can absorb information and begin to understand concepts, ELF workshops try to create an enjoyable, focussed, learning world for children, where they feel good about themselves, each other, and their surroundings. These positive feeling translate readily into positive attitudes.

The first activity is important to set this tone, and to introduce the workshop. Puppet shows work well. Before the show even starts, good feelings grow as children snuggle next to each other on the rug, facing an empty puppet stage (often an overturned table), excited and expectant. In a spring workshop on Bird Songs (concept: Cycles) Rocky Raccoon appears yawning and grumpy, complaining that Mr. Bird has kept him awake for days with his constant singing. Mr. Bird explains that his song is necessary to find a Mrs. Bird. As the show unfolds and Rocky can't persuade Mr. Bird to stop the incessant singing ("Have you considered No Trespassing signs?") the children learn why birds sing and that bird songs convey a number of messages depending on the situation. The ensuing activities all reinforce this theme.

Once the children are in a frame of mind to learn and have become acquainted with the topic, the second activity gets them up and actively involved, often with a new version of a familiar game. Knowing why birds sing, children in the Bird Song workshop experience the importance of being able to distinguish sounds by playing a blindfold search game. Half are Mr.

Puppet shows entertain and educate indoors or out!

JENEPHER LINGELBACH is director of education at the Vermont Institute of Natural Science at Woodstock, VT.

Birds, each singing his own particular song ("chickadeedee," "potato chip" for the goldfinch, "pleased, pleased to meet you" for the chestnut-sided warbler, etc.) and half are blindfolded Mrs. Birds who must find their partners by recognizing the correct song.

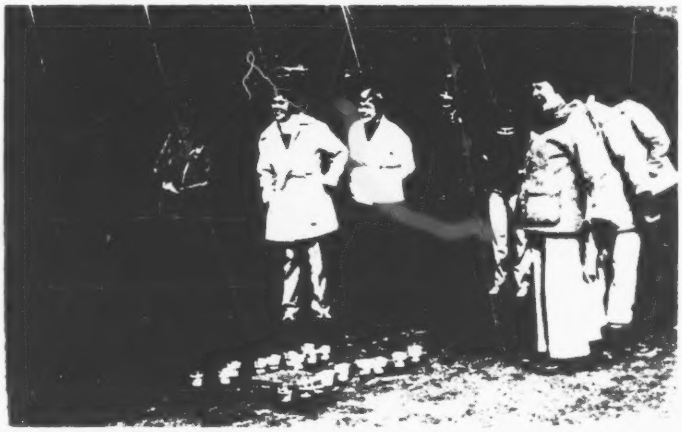
Two "chickadees" find each other — one sang, the other responded!

Different kinds of activities are included in each workshop so that all children experience some success; it is heartening to hear how many of the academically unsuccessful children shine during ELF. A creative child may make a beautiful snow bouquet out of dried weeds and white play dough in the Winter Weeds workshop (concept: Cycles) or weave a colorful, textured grass mat in Grasses (concept: Designs of Nature). The child who does not do well in a highly structured situation may get the most out of a stream exploration or a stonewall investigation.

One of the most difficult challenges for natural science teachers is figuring out how to be a good catalyst for learning while not robbing students of their own discoveries. ELF tries to ensure that all children make their own findings, if possible outdoors. Scavenger hunts, disguised under many pseudonyms such as Forest Foray (workshop: Forest Floor; concept: Habitats), give children items to look for without restricting their individual initiative. Shape, color, texture, size, life stages, whereabouts, patterns of moving, are among the many variables which can be listed for plants and/or animals. No specific identifications are requested nor need they be made by the children. It is not important that the children find everything on the list, but that, with focussed looking, they see and observe. Most findings will relate to the topic, some won't. But a child who has discovered something for the first time, or who has seen a familiar object in a new light, is excited. Excitement leads to learning.

The ELF workshops have been used successfully with children by hundreds of school teachers and outdoor eductaors over the past twelve years. In Vermont, the ELF program has also been brought into dozens of elementary schools throughout the state by community volunteers. Four Vermont Institute of Natural Science staff teach monthly ELF workshops to approximatley four hundred volunteers in some thirty towns. These trained volunteers, (parents, retired people, high school students, environmentally concerned citizens) in turn teach close to 4,000 children in their classrooms and on the school grounds. With no previous science knowledge, these adults can

ELF volunteers in Vermont carry the nutrients from roots to leaves in a "variations on a leaf" relay race.



ELF volunteers cheer on their teammates, who are racing to carry food from leaves to roots in a "variations on a leaf" training workshop.

bring natural science into elementary schools in a new and stimulating way and thus provide one very good answer to the nationwide cry for more science and increased parental involvement in our elementary schools.

It is hard to evaluate exactly what children have learned in ELF. Questionnaires to teachers and parents come back citing positive gains in knowledge and environmental attitudes. Children's compositions about what they learned and what they like give additional feedback. A sixth grader in the small town of Worcester, Vermont, wrote, "ELF has showed me that there is more to something than there appears to be unless you look closely. It has made me realize for instance that when I throw away a can, it doesn't just disappear, and this has made me conscious of how much I waste. ELF has taught me that though a lawn may look dead, it is really alive with bugs and growth. Most of all it's been fun."

An ELF child looks for life in the bottom of a pond.

Children find that an old tree stump is a haven for small plants and animals. ELF is a catalyst for discovery.

Casual stories also reveal what ELF has meant to the children. A parent described a winter dinner suddenly interrupted by his first grader dashing outside to catch newly falling snowflakes to look closely at their different designs. A grandmother told us about her third grade granddaughter discussing insect metamorphosis with her as they walked in a September field.

One Vermont elementary school principal put it this way, "We don't have objective measures of student gains in natural science knowledge or changes in environmental attitudes. But I hear students asking informed questions about natural science and talking about the information presented during ELF. I also hear students asking 'What is it?' or saying 'Be careful' and 'Let me see.' The other day after a snow storm, several students asked 'When do we have ELF? We missed it yesterday.' That type of question is a good evaluation of the program in itself however, because no one mentioned missing gym or art or music or reading or recess."

ELF workshops have opened the door to natural science/environmental education for thousands of Vermont children. Perhaps it could do the same for children in your community.

Note: the ELF Workshops are scheduled to be published in book form by the Vermont Institute of Natural Science in September, 1985. Write VINS, Woodstock, VT 05091 for more information. ☐

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PROJECT ADVENTURE

A Widely Used Generic Product

This program has become a physically exciting and accepted philosophy toward the education of the total person.

KARL ROHNKE

Photograph courtesy of Karl Rohnke

The program is adaptable to many age levels and educational disciplines. The content of an adventure curriculum is unlimited.

Fifteen years ago when Bob Lentz, Mary Smith, Jim Schoel and I began Project Adventure at Hamilton-Wenham Regional High School (Hamilton, MA), we had little indication that our efforts would extend beyond the three-year term of the initial Title III grant. But it did, and the program has become not so much an established and definitive curriculum model as a physically exciting and accepted philosophy toward the education of the total person.

Project Adventure was first offered to high school sophomores only, as a one-year complement to their four-year physical education requirement. The initial grant was for three years, so limiting the curriculum to the 10th grade allowed the staff to evaluate our teaching efforts during the following two nonparticipation years. With satisfying results in hand, we reported to interested teachers that the adventure approach seemed to work best at the sophomore level.

However, since then, teachers dealing with *all* age levels have come to adventure curriculum workshops, and have reported that their adventure adaptations are successful beyond all expectations. This finding points out that the common denominator of this approach is adventure and its inherent challenge activities.

Why generic? Because many educators have found that the precepts and approach of the program are adaptable to many age levels and educational disciplines. The initial Hamilton-Wenham attempt was eventually used by hundreds of Project Adventure trained teachers who created their own programs, often in a HPERD setting.

Challenge is the center of this do-it-yourself-with-guidance approach to learning. Considering the scope of what hands-on challenge can be, the day-to-day content of an adventure curriculum (physical, emotional, and mental challenge) is unlimited.

What is adventure and where is it? While teaching a class in "programmed adventure" (planned activities that challenge students and which have a physically and often emotionally predictable result) at Boston University, I'd ask new students each year to list activities they considered adventurous. The results were usually predictable—white water rafting, parachuting, scuba diving, and rock climbing. Adventure, as presented in the media, has become so closely related to fear, danger, and the "ultimate disaster" that physical consequence has become the criterion for the distinction between adventuring and Disneyland-like diversions.

Are we so attuned to what adventure is *supposed* to be that we forget what adventure *really* is? What about the adventure inherent in learning a new language and applying it, or browsing through an antique store, or accepting a blind date? Considering that adventure involves an activity of uncertain outcome with some risk involvement, where's the consequence? How about traveling in Spain and belatedly realizing that a baño isn't where you order coffee? Do the memories of an unfortunate blind date mismatch need to be dredged up to indicate consequence?

People need adventure of some kind to progress from one achievement level to another, and risk provides the spice that makes achievement satisfying. But the simplicity of rhetoric does not easily define personal experiences that are more visceral than explainable. "You had to be there," often ends a painfully inadequate retelling of an adventure saga and its personal significance. But the significance is undeniable, and positive change regularly occurs as the result of accepting and risking adventure.

Project Adventure has developed a series of learning goals. As you read them, see how easily they apply and adapt to the various academic, physical education, and recreation goals set for your program. Adventure training works because people need the stimulus, respond to the vehicle, and like the results.

1. To increase the participant's sense of personal confidence. By attempting a graduated series of activities which involve physical or emotional risk, and succeeding (or sometimes failing) in a supportive group atmosphere, a person may begin to develop true self-esteem.

2. To increase mutual support within a group. In learning, success and failure are less important than making an effort. A cooperative, supportive atmosphere tends to encourage participation.

Photograph courtesy of Karl Rohnke

Adventure and its inherent challenge is the common denominator in this program.

3. To develop an increased level of agility and physical coordination. People who see themselves as physically awkward often see themselves as inadequate in other ways. Balance, coordination, and agility can be improved with practice, often generating a feeling of personal worth beyond the tangible accomplishment.

4. To develop an increased joy in one's physical self and in being with others. Just as people approaching new situations may be anxious, even fearful, so should they experience joy, laughter, and anticipation.

Project Adventure is an effective, dynamic model useful in a variety of HPERD situations. Through these activities, individuals can acquire personally meaningful experiences in a supportive small group atmosphere. Project Adventure, Inc., currently numbers over 800 adopter programs nationally. For further information, contact the author.

People need adventure of some kind to progress from one achievement level to another, and risk provides the spice that makes achievement satisfying. Personal significance and positive change takes place as a result of accepting and risking adventure.

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New Designs in Conservation/ Ecology Education

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> *"The desired curriculum required to meet future needs of teachers and society in general will need to be problem centered, flexible and culturally as well as biologically valid."*

The Problem

Most of the science being taught is not related to the problems that exist in today's society. There is a mismatch between the science taught and the science needed. The desired curriculum required to meet future needs of teachers and society in general will need to be problem centered, flexible and culturally as well as biologically valid. It will also need to be multifaceted and relevant at the community level. The natural environment, community resources, and the students' (humankind's) need to be the foci of study. Biological information needs to be given in the context of the student as a biological organism in a cultural/ecosocial environment (Hurd, Bybee, Kahle & Yager 1980; Yager 1982). Science is something preservice science teacher trainees take in college but rarely experience as a process of inquiry (Welch, Klopfer, Aikenhead & Robinson 1981). Environmental science, conservation and ecology are now considered synonymous disciplines (Stone 1985). In summary, teachers and students need to be given the opportunity to address personally, in a formal, investigative format, selected, community related, ecosocial issues. In other words, a biology class which is not only taken but also experienced.

Three new designs in conservation/ecology education—Project Learning Tree, Project WILD and The CLASS project—have been developed which are grounded in the recent literature, pertinent to the desired state in preservice and inservice biology teacher training programs (Hurd et al. 1980; Welch et al. 1981; Yager 1982), and which begin at a concrete/factual level and move gradually toward the abstract and theoretical (Stone 1985). As pointed out by Welch et al. (1981, p. 45), "A sufficient array of approaches and materials already exist that can accomplish most of the desired outcomes. The real challenge and need is to deploy the existing materials and techniques in effective configurations suitable to each learning situation."

Part of this array includes Project Learning Tree, Project WILD and The CLASS Project. The purpose of this paper is to: (1) alert biology teachers to the existence of these projects; (2) discuss their educational theory, objectives, instructional designs, implementation procedures, national involvement and recognition; (3) suggest methods for getting involved, and (4) address the educational significance derived from the inclusion of these projects in the mainstream of biology education in America.

Project Learning Tree

Educational Theory: Project Learning Tree (PLT) was based on the belief that teaching involves the structuring of experiences and activities which require students to explore situations, problems and issues, and arrive at appropriate conclusions and positions. Project materials reflect the view that environmentally oriented activities can be inserted at a variety of points in each school subject to demonstrate environmental sensitivity and to contribute to the subject into which they have been introduced. Throughout all the activities, students are encouraged to become involved in data gathering and analysis, problem solving and decision making.

Overall Objectives: The major goal of Project Learning Tree is to enable the student to develop awareness and understanding of environmental relationships and interactions using the forest and associated resources as the primary vehicle. As a result of their Project Learning Tree experiences, students are expected to:

1. expand their definition of "environment" to include all aspects of the cultural and natural worlds and the relationships between them;
2. become personally aware of their presence in the environment, their impact upon it and their responsibility for it;
3. develop the ability and confidence to take an active role in the management of the environment.

Instructional Design: Project Learning Tree curriculum materials are contained in two supplementary activity guides for elementary and secondary grades. Each guide contains 80 or more environmental activities keyed by grade level, subject, and concept. Activity groups are arranged around a curriculum framework composed of seven key principles: (1) environmental awareness; (2) diversity of forest roles; (3) cultural contexts; (4) societal perspectives on issues; (5) management and interdependence of natural resources; (6) life support systems, and (7) lifestyles.

The activities are in a non-sequenced format. The body of each activity usually consists of identification of: subject area; grade level; PLT principle being addressed; detailed statements of the main ideas underlying the PLT principle; intellectual processes which the activity attempts to develop and/or refine; a stated learning outcome (objective) to be anticipated through use of the activity; an explanation of the instructional procedure; alternative activities to accomplish the objective; and suggestions for additional projects to provide for more extensive exploration of the learning principle. Complete lesson plans with additional or follow-up activities are provided. However, teachers may insert activities at the most appropriate points in their programs using any selected number.

Intellectual and valuing skills to be applied through the use of the lesson activities include acquisition and verification of knowledge, communication, effective group participation, critical thinking, creative problem solving and development of skills which assist in the processes of recognizing, clarifying, managing and solving problems.

Implementation Procedure: Project Learning Tree is introduced into a new state through agreement among its national office, cosponsors and, usually, the state education agency. Cosponsors are the American Forest Institute (AFI) and the Western Regional Environmental Education Council (WREEC). The start-up and implementation costs have typically been provided by AFI, frequently with the cooperation of state forestry groups, industry, environmental education associations, local school districts, private conservation organizations, universities and the state department of education.

The state PLT advisory committee, consisting of representatives of the forest industry, education community and civic environmental groups, develops an implementation plan whereby a cadre of facilitators is trained by the national PLT staff during a two and one-half day workshop. The facilitators establish the protocol for conducting statewide teacher workshops. Presently, PLT activities are made available to teachers only after they have completed an approved six-hour workshop.

Teacher workshop sponsors can include school districts, nature centers, county or area school superintendents, and soil and water conservation districts among others. The activity guides are provided gratis by AFI for each participant. Each participant at a local workshop submits an evaluation form and is placed on a mailing list to receive PLT's newsletter, "The Branch." Additionally, some colleges and universities have offered extended length workshops for academic credit.

National Involvement: Project Learning Tree began in the early 1970s from a small gathering of environmental educators and resource management personnel in Wyoming with a common goal to formulate a set of K-12 supplementary activities with the aforementioned objectives. Later, in 1973, the American Forest Institute provided a grant to the Western Regional Environmental Education Council (WREEC), composed of representatives of the state departments of education and natural resource agencies in the western states, for the development of PLT activities. PLT materials were developed by educators with the help of private conservation organizations, industry groups, and resource managers from state and federal agencies. Project Learning Tree became officially available in 1976. To date, Project Learning Tree has been introduced into 35 states (Table 1), Denmark, Sweden, and the provinces of Quebec, New Brunswick and British Columbia in Canada. PLT has reached more than 66,000 educators, with the potential of reaching more than three million students annually with activities from the PLT materials.

Awards: The National Arbor Day Foundation selected PLT as a winner in the Corporations and Institutions category for excellence in environmental education. PLT was also a corecipient of the National Wildlife Federation's National Conservation Award through WREEC.

Follow-up: In 1983, a survey was sent to a random sample of 10,000 PLT educators throughout the United States. The survey addressed three significant questions raised by sponsors of Project Learning Tree:

1. Are teachers using PLT materials?
2. Are teachers using PLT materials in a manner consistent with their intended goals—to prepare students to make environmental decisions based on information, not emotion; and to help them become more aware of the importance of productive forests in their lives?
3. Is the project working? Are students learning anything from PLT activities?

After one to three years of PLT workshop participation, 70 percent of the respondents are still using project materials of which 98 percent reported planned continued use. More than 75 percent of those using PLT materials are classroom teachers of whom the majority are in elementary schools. Others include administrators, university faculty, resource agency personnel and citizen volunteers. Respondents reported using at least six to ten activities in any school year but some used up to 60 activities. They devote at least 30 minutes of instructional time on each activity. Most teachers who reported using the PLT activities also stated that PLT provides, "students with opportunities for learning that are interesting, useful, instructionally sound, and often fun for the students as well." Additionally, about 75 percent of PLT teachers use project materials to supplement and enrich their classes in math, science, reading, social studies and language arts.

The majority (80%) of teachers used PLT materials in a manner consistent with its intended goals and original design—to promote a balanced view in order for students to make more informed decisions. For example, one teacher reported that, before exposure to PLT, his students refused to take the part of forest products executives in a mock policy debate on forest management. These attitudes almost disappeared after the students had worked with PLT activities.

Eighty-five per cent of the teachers reported that most or many of their students have a *greater awareness of the forest resource and the environment* as a result of PLT. Eighty-four per cent reported that most or many have *more responsible attitudes toward natural resources and the environment*. Sixty-five per cent reported that their students have *increased awareness, knowledge, and skills concerning the many ways wood and paper products are used in their day-to-day lives*. Based on the evidence available, it appears that PLT is accomplishing the educational goals it was designed to achieve.

Project WILD

Educational Theory: Project WILD is an interdisciplinary, supplementary environmental and conservation education program emphasizing wildlife. It is based on the premise that young people and their teachers have a vital interest in learning about the earth as home for people and wildlife. The program emphasizes wildlife—because of its intrinsic, ecological, aesthetic and educational values (Adams 1982, 1983; Shaw & Mangun 1984), and its importance as a basis for understanding the fragile grounds upon which all life rests. Project WILD is designed to prepare young people for decisions affecting humankind, wildlife and their shared home, earth. In the face of pressures of all kinds affecting the quality and sustainability of life on earth as we know it, Project WILD addresses the need for humans to develop as responsible members of the ecosystem.

> *". . . teachers and students need to be given the opportunity to address personally, in a formal, investigative format, selected, community related, ecosocial issues. In other words, a biology class which is not only taken but also experienced."*

Overall Objectives: The goal of Project WILD is to assist learners of any age in developing awareness, knowledge, skills and commitment resulting in informed decisions, responsible behavior and constructive actions concerning wildlife and the environment upon which all life depends. The specific objectives of Project WILD were reported by Bybee (1984).

Instructional Design: Patterned after PLT, Project WILD curriculum materials are contained in two supplementary activity guides for use by teachers of students in elementary and secondary grades. More than 80 instructional activities within project materials are designed for easy integration into school subject and skill areas including science, social studies, language arts and mathematics. Therefore, classroom teachers may use the materials as a means to teach the required concepts and skills in their curricula and at the same time involve people, wildlife and the environment as the focus of study. Project materials have also been found to be appropriate in community education settings such as in nature centers and outdoor education camps as well as with scout groups and park naturalists, among others.

Teachers may use one or many Project WILD activities. The activities may be integrated into existing courses of study, or the entire set of activities may serve effectively as a single course of study.

The conceptual framework underlying the Project WILD activities moves from awareness and appreciation to responsible human actions. The major sections of the conceptual framework are: (1) awareness and appreciation of wildlife; (2) human values and wildlife; (3) wildlife and ecological systems; (4) wildlife conservation; (5) cultural and social interaction with wildlife; (6) wildlife issues and trends—alternatives and consequences; and (7) wildlife, ecological systems, and responsible human actions.

Each activity includes a statement of the instructional objective; a brief description of the instructional method employed; background information for the instructor; a list of any materials needed; step-by-step procedures; a few examples of ways in which to evaluate student learning; recommended grade level; major subjects from which concepts are drawn; skills; duration; recommended group size; setting (indoors or outdoors); and key vocabulary. Each activity also includes a listing of points in the conceptual framework to which the activity corresponds directly or indirectly.

Implementation Procedure: Project WILD is introduced into a new state through agreements among its national office, cosponsors, and the state wildlife agency and/or education agency in an implementation process similar to that used with PLT. National cosponsors are the Western Regional Environmental Education Council (WREEC) and the Western Association of Fish and Wildlife Agencies (WAFWA). Selected members of these two organizations and additional at-large members form the national steering committee. States become associate sponsors of the program with a one-time $7,000 payment which may come from a variety of sources including state funds or grants from private wildlife/conservation groups. A state coordinator from the state wildlife or education agency or co-coordinators from both agencies is identified. An advisory council consisting of representatives of education, resource agencies, civic organizations, extension agencies, and wildlife related organizations, among others, is typically formed. A cadre of project facilitators are identified and trained by representatives of the national Project WILD steering committee. The facilitators then develop and conduct teacher training workshops. As with PLT, Project WILD activity guides are made available to teachers after they have completed the six- to seven-hour training workshop. Project WILD teacher workshop sponsors include school districts, nature centers, resource and extension agencies, and private or civic wildlife organizations. The activity guides are provided gratis by the state sponsors for each participant.

National Involvement: The development of Project WILD began in January, 1981 and activity guides were first made available in the fall of 1983. Project WILD activity guides were developed as a joint effort between educators and wildlife resource specialists. To date, Project WILD has been introduced into Canada and 33 states (Table 1). It is estimated that 80,000 educators have participated in training workshops to date and based on their projected use of project activities in school and community education programs it is estimated that Project WILD will reach nearly 10 million students during the 1985–1986 school year.

Awards: The Project WILD program or its principal sponsors were acknowledged with conservation education awards from the National Wildlife Federation, the Conservation Education Association, the North American Association for Environmental Education and The Wildlife Society—all within the last three years! Project materials have been endorsed by the National Council for the Social Studies and are consistent with the guidelines of the National Science Teachers Association for science/society instructional materials of quality. Both PLT and Project WILD have been cited for their value in helping students think about the environment and science-related social issues in *Research Within Reach: Science Education, A Research-Guided Response to the Concerns of Educators* (Holdzkom & Lutz).

Follow-up: A survey of Project WILD educators, similar to the one conducted for PLT, will be conducted in 1986. However, a field test of Project WILD was conducted in 1982 using 259 elementary or secondary teachers and more than 6,000 students living in rural, suburban and urban communities in Washington, Colorado and Virginia (Fleming. 1983. Project WILD Evaluation: Final Report of Field Test, WREEC).

Evaluative elements germane to this report and included in the field test were:

1. the comparative affective and cognitive growth of elementary and secondary students;
2. teacher interest in wildlife, environmental issues, and activity oriented learning materials as related to successful achievement of Project WILD goals;
3. the level of integration of Project WILD activities into nonscience related curricula.

A pre- and post-test format was designed for three teacher groups; workshop participants, teachers who received project materials without workshop training and a control group with no materials or workshop training. Elementary, junior high and high school grade levels were represented in each teacher group.

The most significant finding was that student performance across grade groups differed significantly. Primary students gained the greatest score differences followed by junior high students, while students in grades 10–12 gained the least on cognitive and affective measures (ANCOVA, $P = .001$; ANOVA, $P = .001$). Significant differences (cognitive, $P = .001$ to $.08$; affective, $P = .02$ to $.04$) were found across grade groups when the gain in score was analyzed according to the teacher's ability to integrate Project WILD activities into the curricula (affective not significant); previous use of environmental education materials; participation in a Project Learning Tree workshop; doing a specific unit about wildlife; and the number of activities done by teachers. Therefore, students did better on the cognitive and affective tests when their teachers had a background in environmental education, integrated the materials into their curricula, did a specific wildlife unit, took animal-related field trips, and used five to 35 Project WILD activities. Elementary teachers fit this description more often than secondary teachers who had difficulty identifying the relationship between Project WILD activities and the district objectives in their disciplines, utilizing the activity format of project materials, and using any other curriculum format other than the standard textbook.

Science was the subject into which most (83%) elementary teachers incorporated Project WILD activities. Other subjects in which elementary teachers reported using project activities included language arts (35%), art (20%), social studies (15%), mathematics (11%), reading (9%), outdoor education camp (7%), creative writing (4%), and physical education, handwriting, spelling and vocabulary development (2%).

At the high school level, the majority (72%) of teachers taught science. Others taught social studies (13%), language arts (9%), environmental education, industrial arts and special education (2%), and physical education (1%). The difference in cognitive gain mean scores was not significant (P = .12). However, mean scores for language arts classes ($\bar{x}$ = 2.25) were greater than those of science ($\bar{x}$ = 0.91) and social studies ($\bar{x}$ = 1.05). There was no difference in affective gains in all high school subject areas. Even though Project WILD was used most often in science classes and to teach science, the greatest cognitive gains occurred in the language arts and communications areas at the high school level.

The CLASS Project

Educational Theory: The CLASS Project is a response to the concern that many students do not feel like effective members of our culture and too rarely see academic disciplines as related and relevant to the world around them. Therefore, The CLASS Project was developed to enable students to develop an environmental ethic and help them use their acquired skills and concepts in taking thoughtful, positive action that will protect and enhance the natural environment. Project materials contain relevant content elements but emphasize the process skills of observing, measuring, data collecting, classifying, hypothesizing, predicting, making value judgments, communicating and problem solving, as these skills are related to prevailing environmental issues within the students' communities. Thus a bridge between knowledge gained and community applications is the educational paradigm represented in The CLASS Project.

Overall Objectives: The major goal of The CLASS Project is to help students learn how to identify and solve environmental problems. The background information and investigations in each content area concentrate on providing and gathering unbiased data concerning the environmental issues under investigation. Therefore, The CLASS Project was designed specifically to provide reality experiences in gathering and using information to solve ecosocial problems within the students' zone of community contact. The specific objectives of The CLASS Project were listed by Bybee (1984).

Instructional Design: As with PLT and Project WILD, The CLASS Project materials were designed as supplementary materials to existing curricula. There is no prescribed order for either the content areas or for many of the investigations within a given content area. Materials were designed as "hands-on" thus reducing lecture time and increasing the amount of time students become part of the learning process; ie. many of the investigations lend themselves to the inquiry approach to learning. Open-ended questions, presented throughout the material, were carefully designed to stimulate creative thinking. These questions and related group problem solving activities guide students to utilize a coherent process of analyzing choices, making decisions and taking thoughtful actions.

There are nine sections in The CLASS Project. The first section is an introduction and overview. This is followed by six content areas including Energy Use, Environmental Issues, Forest/Watershed Management, Hazardous Substances, Wetlands, and Wildlife Habitat. Each of these content areas includes several components:

1. relevant background information for the teacher about the content area, and content objectives;
2. a set of four or five investigations in which students explore the topic and learn management and ecological concepts;
3. a list of suggested community action projects along with instructions for getting started;
4. a list of optional research projects to further develop the students' skills;
5. a color poster illustrating the central concept of the content area;
6. a divider which lists ways to use the poster to introduce the content area to the students.

Following the six content areas, there is a section titled, "You Can Make it Happen." This section contains nine case studies of class projects that were conducted by other teachers. The last section, titled "Digging Deeper/Glossary," contains the resource bibliography and two pages of glossary terms.

Implementation Procedure: As with PLT and Project WILD, distribution of The CLASS Project begins with the recognition of a state agency or group to sponsor introduction and implementation of project materials into public and community educational settings. With The CLASS Project, conservation education leaders representing state agencies, educational systems, and conservation groups are the target audience for initiating implementation. Implementation procedures include facilitator training workshops conducted by staff from the National Wildlife Federation followed by the development of statewide teacher training workshops.

National Involvement: In January 1980, the National Wildlife Federation began the development of a series of environmental education investigations designed to help middle/junior high school teachers and students to become involved in community environmental projects. Development costs were supported by a two and one-half year grant from the National Science Foundation through its Development in Science Education (DISE) office. In 1982, the Federation published The CLASS Project loose-leaf binder of investigations designed to provide students with the knowledge and basic skills they will need to carry out a community environmental project—a CLASS Project. CLASS is an acronym for Conservation Learning Activities in Science and Social Studies. As of January 1985, 20 states (Table 1) have developed CLASS Project workshop networks and more than 3,000 educators have been trained in the use of the materials.

Getting Involved

Those readers interested in Project Learning Tree, Project WILD or The CLASS Project may want to refer to Table 1 to learn the status of these programs in their state. If your state has adopted any one of these projects, then contact your State Department of Education (Environmental Education Department) or State Wildlife Agency (Information and Education Division) to receive information on training workshops. If you are in one of the states that have not adopted PLT, Project WILD or The CLASS Project then you may want to inquire about the possibility of your state doing so in the future. Implementation information may be obtained from the directors of each of these projects (Table 1). Implementation procedures begin with teacher, administrative, and resource agency interest and support.

Significance

Any biology program at any grade level incorporates plants, animals and ecology. However, presentation of information is usually in a formal, didactic, textbook dominated format. Plants, animals and their environments are presented as isolated entities—the subjects of isolated chapters. A determination of the interconnection of these elements requires a separate educational program and/or textbook often called environmental education. The purpose of this paper was to demonstrate that this existing condition in biology education need not and cannot persist. Humankind needs to take an ecosystem approach to the study of biology. Project Learning Tree, Project WILD and The CLASS Project were all designed using ecosystem approach as the foundation for activities development. Additionally, each project targets the desired state in biology education discussed at the beginning of this paper. All three projects have established their credentials in terms of national and international adoptions, awards, recognition of relevancy in other disciplines and focus on the educational needs of the majority public in school and community educational settings.

> *"We invite, even challenge, our colleagues to take the next step of exploring these contemporary adventures in conservation/ecology education."*

Follow-up studies and field tests of two of the projects indicated project materials were used most often in the elementary and junior high classrooms. High school biology teachers appeared to have the most difficulty integrating project materials with the state adopted essential elements in their biology programs. To demonstrate the relevancy of project materials in meeting state mandated learning objectives, a few correlations which demonstrate the close interrelationships between project activities and specific learning objectives have been developed by the national sponsors, state advisory councils for each project or individual teachers within a state. In each case where these correlations have been developed, eg. California's state science appendum with Project Learning Tree and Project WILD, the compatibility between project activities and the state recommended or required learning objectives is easily identified.

The more important problem appears to be that of secondary biology teachers adjusting to an activity style of teaching and utilizing supplementary curricula with the textbook. This problem may be solved through peer recognition and acclaim of the value of these new designs in conservation/ecology education as valuable resources for the emerging biology classroom of the future. Toward this end, we have provided a first step. We invite, even challenge, our colleagues to take the next step of exploring these contemporary adventures in conservation/ecology education.

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Table 1. States Where Project Learning Tree (PLT), Project Wild (PW), or the Class Project (TCP) have been implemented.

	Project Availability[B]		
STATE[A]	*PLT*	*PW*	*TCP*
Alabama	X		
Alaska		X	X
Arizona	X	X	
Arkansas	X	X	
California	X	X	X
Colorado	X	X	X
Connecticut	X		X
Delaware		X	
Florida	X	X	
Georgia		X	X
Hawaii	X	X	
Idaho	X	X	
Illinois	X	X	
Indiana			X
Iowa	X		X
Kentucky	X	X	
Maine	X		X
Maryland	X		X
Massachusetts	X	X	
Michigan	X		X
Minnesota	X	X	
Mississippi			X
Montana	X	X	
Nebraska		X	
Nevada	X	X	
New Hampshire	X		
New Jersey	X	X	X
New Mexico	X	X	
New York	X	X	X
North Carolina		X	X
Ohio	X	X	
Oklahoma		X	
Oregon	X	X	X
Pennsylvania	X	X	
Rhode Island	X		
South Carolina	X	X	
South Dakota			X
Tennessee		X	X
Texas	X	X	
Utah	X	X	
Vermont	X		X
Virginia	X	X	
Washington	X	X	X
West Virginia	X		
Wisconsin	X	X	X
Wyoming	X	X	X

(A) Missing states have not yet implemented any of the above three projects.

(B) Project Directors:

Project Learning Tree
Kathy McGlauflin,
American Forest Institute
1619 Massachusetts Ave., N.W.
Washington, D.C. 20036
(202) 797-4500

Project Wild
Cheryl Charles
Salina Star Route
Boulder, Co. 80302
(303) 444-2390

The Class Project
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Educational Material Development
National Wildlife Federation
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TEN MINUTE FIELD TRIPS:
Using the School Grounds to Teach

Helen Ross Russell, *Environmental Education Consultant*

School grounds are the best possible place to initiate environmental education. They are a microcosm: a sample of the greater community in which students live. Not only are the natural forces all illustrated by community attitudes toward children, economic values, litter, animals and space are equally evident.

School grounds provide a resource for relating textbook concepts to everyday life and for understanding interrelationships which tie the world together. They are available for simple observations and experiments as well as for on-going studies and research. In some instances school grounds provide an area for active participation in environmental improvement.

They offer a safe area for teachers who have little outdoor knowledge since pre-planning trips poses no problem and selection of the site to fill the needs of the topic is simple. Often the custodian's assistance can be enlisted.

Teachers often hesitate to take field trips because they feel insecure and are sure that the class will ask things that they cannot answer. A well-planned school ground trip eliminates this. The purpose of the trip has already been determined in the classroom; the questions to be answered and observations to be made have been listed; equipment, if needed, has been distributed; children have trip boards or other recording devices. This is not a free-for-all into uncharted territory. It is not a "learning" of 20-50-100 things as the teacher may have experienced in a college field course. It is a tightly organized activity which fits in the setting of the classroom learning and greatly enriches it.

The length of the trip will vary with the topic and the class. Repeat trips may be made every hour, week, or month to record changes. Repeat trips may also be made to settle a controversy; no need to settle an argument about conflicting data when re-measurement can be carried out!

In any school system many topics will reappear over the years just as they do in classroom situations. Thus, the study of shadows by pre-schoolers is an observational, discovery activity which can challenge thinking ("make your shadow disappear"). Early elementary children may make a sundial or observe the change in size and position of their own shadows, while middle school children may make a monthly record of shadow length and position and correlate it to Earth's axis and movement. Both of these are strengthened as thinking, reasoning activities by asking for predictions of the next shadow position. High school students may repeat Erastothenes' measurements which enabled him to compute the circumference of the earth as 24,000 miles in 240 B.C.

Trees, too, offer opportunities for many types of studies. A tree can be an all year object of observation and chart making for pre-schoolers; while children in the primary or middle grades may keep individual records of individual trees. Middle school children can also use trees for measurement, math, and graphing studies (see *Nature Study* Vol. 36 Nos. 3 & 4).

Every school ground will provide some opportunity for animal study. (If the area is bare asphalt with no planted edges the lack of animals can be noted followed by a discussion of: why no animals? Can we change the situation? Where is the nearest food and shelter? (This may involve an around-the-block field trip.) Don't overlook invertebrates or miss the opportunity to do tracks in winter, even if they are only dog and human.

The possibilities of school ground learnings are almost limitless. Among them can be:

Weather and weather prediction.

Changes—growth, aging, decay, sun and shadows, leaf coloration, the moon, flowers to seeds, seeds to plants, oxidation, decomposition, disintegration.

Geology—local rocks, erratics, building materials, river systems after a rain, soil formation, deposition of silt, building tools.

Temperature—conduction, radiation, convection, wind, heat from buildings, people and cars, different absorption rates of different materials, different radiation rates, conclusions about rural/urban temperatures, role of trees.

Water—take a rainy day field trip to learn about run-off, deserts, plants and rain, river systems, water as a cleanser, water as a transporter, collect some rain water before it touches the ground, collect water from the gutter.

Recycling—the school ground is a perfect place to bury a variety of materials for a fortnight or longer and observe decomposition, or lack of it, decomposers at work, soil production.

Asking questions and seeking answers, experimenting, mapping, measuring and record keeping; when these skills are mastered horizons may be expanded and longer field trips taken; but always the school grounds are available for comparison, for new studies and for in-depth studies which cannot be undertaken or completed on a field trip far from the school base.

Obviously the school grounds should not be the province of one subject area. Like environmental education, studies should envelop social sciences as well as natural ones, language arts and art as well as math. Even politics and international education may be learned in part on the school site; for what better way to learn about political action than to try to bring about a change? Several years ago, ANSS member Fran Ludwig's class tackled the problem of black smoke being emitted by the school's furnace and learned a lot about city government in the process.

Any older class in the northern U.S., or any desert area, can appreciate the importance of world economy and interdependence if they stand outdoors on a winter day and search for the source of their oxygen.

The possibilities are endless, the resources great. Like a set of encyclopedias, the area just ouside the classroom is easy to use if we tackle one topic at a time. ☐

From *Nature Study*, journal of the American Nature Study Society, vol. 37, no. 3&4, March 1984, p. 8. Reprinted by permission.

From *Nature Study*, journal of the American Nature Study Society, vol. 38, no. 2&3, January 1985, pp. 26-28. Reprinted by permission.

TIPS for Environmental Education . . .

Teacher Aids for Using a Discovery Trail

Paul T. Zeph

Virtually every nature center has a "discovery trail" — a trail of numbered stations with a corresponding paragraph or two in a booklet interpreting an item of interest at that station. This is a popular and useful method for the general public to obtain an informative, interpretive walk without a naturalist-guide. For a school group of thirty students, however, this discovery trail booklet is all but useless. The information is interesting, but the teacher must read everything to the students, the pictures are too small to hold up for everyone to see at once, and there is often nothing the student can do except stand quietly and listen. What could potentially be an exciting outdoor experience becomes a struggle between the students' boredom and the teacher's patience.

At Aullwood Audubon Center and Farm, we've taken a typical discovery trail and added a unique set of materials and equipment for teachers to use; transforming an ordinary self-guided visit into an exciting adventure, involving discovery, student participation, group dynamics, and creativity. This self-guided package is borrowed by the teacher for the visit, and includes three components: 1) a booklet of trail activities; 2) a backpack of simple field discovery equipment; and 3) a set of laminated visual aids.

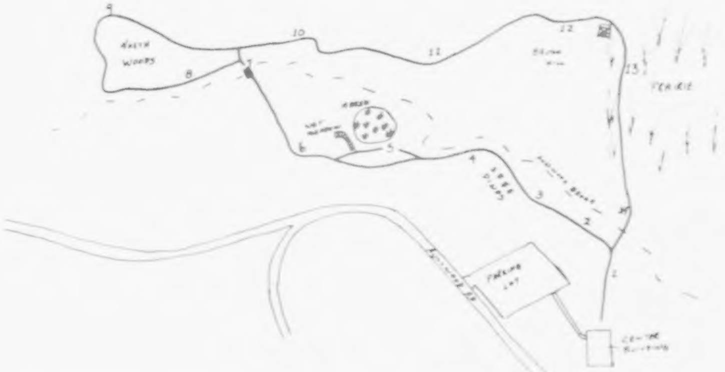
The booklet of trail activities is the most important part of these materials. It provides the teacher with information about the trail and with group-oriented activities, allowing a teacher with no prior experience with our trails, or knowledge about the natural world, to lead an excellent interpretive walk. At each station the same topic is addressed as in the general public discovery trail booklet, but the approach is different. An activity is presented at most stations that requires the students to get involved with the natural world they are in: at the marsh, they will explore for aquatic organisms; in the woods they turn over logs and seek out woodland creatures; elsewhere they divide into teams and search for plant shapes and colors; along one trail they do creative movement and move as their favorite animal would; and at another station they fantasize as poetry is read to them.

For each activity, the booklet details procedural steps, gives the teacher instructions to read to the students, and suggests questions to ask students to facilitate a good questioning process. We have found that most teachers are reluctant to lead a group of children on a nature walk because they don't know what they'll see, or feel they won't know what to do or say while on the trail. Materials such as these alleviate much of their fears and also promote a good questioning process, group problem solving, and outdoor learning.

The second component, a backpack of field equipment, adds immeasurably to the students' trail adventure. Each backpack contains plastic hand magnifiers on a neck rope (one for each child), aquatic discovery equipment (a shallow pan to hold organisms and small metal strainers), and assorted vials and plastic boxes to contain small creatures for examination. The magnifiers encourage children to get very close to things they would otherwise overlook, such as flower parts, insects, or fungi. The aquatic equipment enables students to become actively involved with aquatic life for they can scoop up a water strider, diving beetle, or dragonfly nymph to observe in a pan, instead of standing along the shore listening to the teacher lecture on the life in a pond or stream.

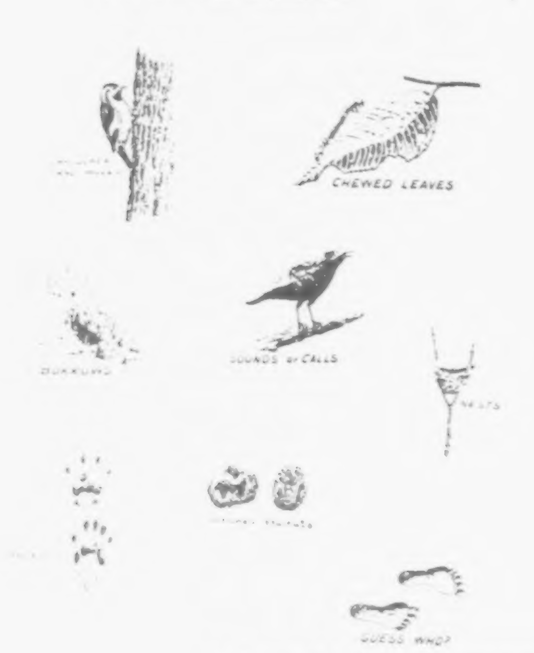
The final component, a set of laminated visual aids, is also carried in the backpack. These are simply-labelled pictures on 8½" x 11" cards that correspond to various stations along the trail. The pictures are big enough for a group

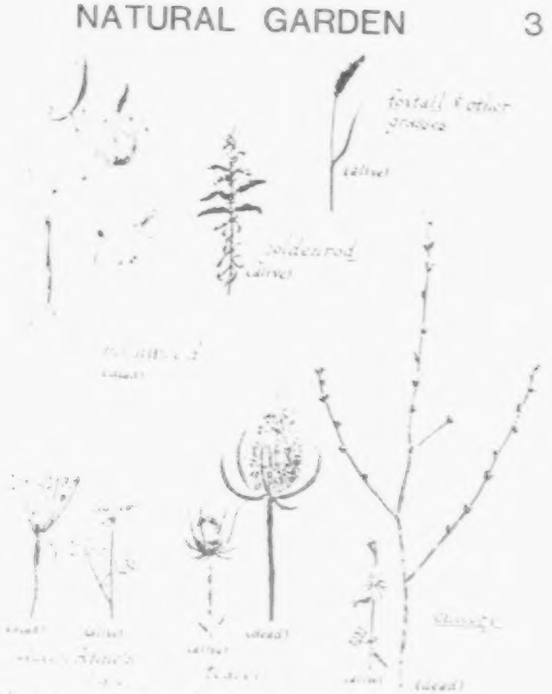
DISCOVERY TRAIL



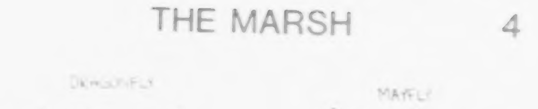
Map of trail and booklet that is given to teachers ahead of time to read through to pick out most appropriate activities for visit.

Paul T. Zeph is an environmental education specialist for the National Audubon Society at the Aullwood Audubon Center and Farm in Dayton, Ohio.


ANIMAL SIGNS
1
CHEWED LEAVES
BURROWS
SOUNDS or CALLS
NESTS
GUESS WHO?


NATURAL GARDEN
3
foxtail & other grasses
(alive)
goldenrod
(alive)
(dead)
(alive)
(dead)
(alive)
(dead)
thistle
(alive)
(dead)

Copies of a few of the laminated cards contained in the backpacks for teachers, to show at various points along the trail — aids greatly in helping the younger children understand concepts — makes concepts more concrete.


THE MARSH
4
DRAGONFLY
Adult
Nymph
MAYFLY
Adult
Nymph
CADDISFLY
CLAM
SNAIL
Green Frog
MUSKRAT

8
1/3 of Prairie Plants Above Ground
2/3 of Plants Below Ground

Burning the prairie every spring removes the dead plants but does not harm the roots.

Children using strainers to collect aquatic organisms.

of children to see when huddled around a leader; and are laminated to make them last a few years (clear contact paper is an inexpensive substitute for lamination). These pictures are extremely important for elementary students, as the children require concrete visual images to truly comprehend and understand certain abstract concepts. Some examples are: animal signs to look for, the life cycle of a tree, decomposer organisms, prairie plant roots, or the travels of the water in our brook after it leaves our property.

Each of these three components by themselves — the booklet of activities, the backpack of equipment, and the visual aids — are tried and true interpretive tools used widely by many educators in the field. The combination of these components, however, is an exciting, new approach for self-guided groups; and provides a richer, more meaningful experience for both student and teacher.

Note: A copy of Aullwood's self-guided trail booklet and visual aids is available by sending $2.00 to cover printing and mailing to: Aullwood Audubon Center and Farm, 1000 Aullwood Road, Dayton, Ohio 45414.☐

Children using hand lenses which forces them to get close to nature and interact.

This article is reprinted with permission from the *Journal of Physical Education, Recreation and Dance*, May/June 1986, pp. 61-63. The *Journal* is a publication of the American Alliance for Health, Physical Education, Recreation and Dance, 1900 Association Drive, Reston, VA 22091.

ELEMENTARY PHYSICAL EDUCATION

Involving Outdoor Adventure Activities

Initially envisioned strictly as a part of junior and senior high school programs, the adventure philosophy is slowly becoming evident in elementary physical education programs.

GARY K. MOORE

Outdoor adventure programs and activities have steadily increased in the nation's schools. Originally incorporated into junior and senior high school programs, adventure activities are becoming part of elementary school programs as well. Siedentop, Herkowitz and Rink (1984) suggest several possible explanations for the popularity of these adventure activities so early in the educational process. They say the activities allow:

- *active participation regardless of skill level,* which encourages involvement from all students.
- *success in challenging activities,* which can be just as rewarding as blasting the kickball over the outfielder's head . . . and which carries with it a greater probability for success.

Farrington (1976) agrees. "Games . . . [that develop trust and cooperation] are not so much a way to compare our abilities as a way to celebrate them."

- *experience in a different, noncompetitive atmosphere.* Orlick (1982) writes, ". . . [adventure] games are designed so that cooperation among players is necessary to achieve the objectives of the game; children play together for common ends rather than against one another. . . ."

Just as pyramids provide an opportunity for children to use basic gymnastic skills learned in a tumbling program, adventure activities offer children the opportunity to develop cooperation, trust, and problem-solving skills. These skills, in turn, may enhance the caliber of children's performance in organized sports. Furthermore, in a recent *Journal* article on team dynamics, Freischlag (1985) stated that the more students are permitted to participate in problem-solving games, the more they are likely to demonstrate high levels of positive involvement in team tasks assigned to them. For physical educators, this has real implications for lead-ups to team sports.

At an elementary school near Columbus, Ohio, adventure activities have been a part of the program for ten years. Worthington Hills Elementary School incorporates adventure games and activities into four different aspects of the school curriculum. First, adventure activities are woven into the basic instructional program. Three weeks of adventure instruction are offered during the school year, and some additional adventure activities are taught all year long. When introducing team sports, cooperative games—a kind of adventure activity—are used as a lead-up.

Indoor climbing walls

One of these three "adventure weeks" is of particular interest. During this time, students in grades four through six have the opportunity to scale three indoor climbing walls. The horizontal traverse wall, which progresses sixty feet along the gymnasium, in-

Photograph courtesy of Gary Moore

Students enjoy "high adventure" on a field trip to a high ropes course.

troduces students to some basic climbing and safety techniques. This teaching station requires a minimal amount of floor space and uses an often neglected part of the physical education classroom—the walls. Blocks of different sizes and configurations are bolted to the wall at heights ranging from a few inches to five feet. The children traverse along the wall using a variety of hand and foot holds; they are never farther from the floor than the height of a balance beam.

This activity has tremendous value, for it offers an activity which can be made either more or less challenging by using special color-coded blocks. Thanks to some clever paintings by the school's art teacher, students scramble along the simulated mountain ridge in the company of rock climbers, mountain goats, snakes, vipers, and other fantasy friends. Near the end of the traverse are wall charts where students can indicate their level of success by signing their names under appropriate classifications. This simple traverse wall can be constructed for less than $100 if you find a local lumberyard to donate 50 to 60 mahogany wood blocks. The paint comes from the students, who bring leftover paint from home. A talented and willing art teacher can mix the paint to form the necessary colors and create a very attractive scene. At the same time, you've come up with an effective public relations tool.

From the traverse wall, the students progress to one of the two vertical climbing walls which reach 23 feet to the top of the gymnasium. Once on top, the students can sign their names on the "snow covered" simulated peak, Mount Hawkeye, or they can honk the horn and touch the "golden egg" at the top of the "bean stalk." An "I can" feeling soon prevails—it comes when students reach the top, or even when they manage to extend their range to the next block.

These vertical climbing walls are somewhat more difficult to construct than the traverse wall and involve more expense since this activity must depend upon effective overhead belay anchors and specialized safety equipment. However, the vertical wall is still within reach of the creative, energetic physical education instructor. You must, however, get expert construction advice before sending your students to the top.

As in most individual sports and activities at the elementary level, teachers must constantly be in a position to adequately supervise the children. So how does the physical educator offer a variety of adventure activities and a large amount of activity time while maintaining an adequate level of supervision? The answer lies in the "rotation method." The instructor simultaneously conducts a high climbing wall challenge and several lower level individual and group challenges. The students rotate between the high wall and the low level activities, receiving *close* supervision while on the climbing wall and less stringent supervision during the low level activities. The instructor is free, however, to give plenty of *verbal* feedback to both groups.

The intramural program

The second aspect of the school curriculum which contains an element of adventure is the intramural program. As with all skills, children need an opportunity to practice adventure activities, and the instructor must give the students an adequate number of practice opportunities. Therefore, adventure games are included in all field day and special event days. This also helps to achieve a comfortable balance between competitive and noncompetitive events.

Field trips

The third aspect of the curriculum which exposes youngsters to adventure experiences is the resident camp program. Sixth grade children have the opportunity to test their newly acquired adventure skills during a three-day camping session. Approximately 50 percent of the camp curriculum is devoted to extending the adventure program into a natural, outdoor environment.

The final aspect of the curriculum that allows for adventure instruction is the series of one day field trips to the Adventure Education Center. This experientially-based center offers a variety of adventure and outdoor activities for area youth. Here, public school teachers become trained adventure education leaders. The center represents a cooperative effort among three agencies—the Ohio State University School of Health, Physical Education and Recreation, the Godman Guild Association which is an area social service agency, and International Field Studies, Inc. which offers logistical and program support to field trip leaders. Area schools provide students with many new and exciting activities which are not normally available to them. Students use the facility as the site of culminating activities for the adventure unit.

At the center, students have the opportunity to participate in a variety of adventure activities. For example, they can try the low level challenge course and then progress to a 20-foot high ropes course. Selected archery students can compete in the annual "Robin Hood Games." Thirty to 40 students learn to use first-rate archery equipment and shoot at three different archery ranges located at the center. The local parks and recreation department is now offering classes and more practice opportunities for students who are interested in archery. Over 90 trained area teachers are becoming actively involved in the program.

Challenging adventure activities develop not only the body but one's inner being as well. Aristotle issued a challenge to physical educators as early as 350 B.C. "The results of good physical education are not limited to the body alone, but they extend to the soul itself." If, in 1986, we are to develop both body and soul, then the importance of creative, challenging adventure activities in the elementary physical education curriculum cannot be ignored.

Just as pyramids provide an opportunity for children to use basic gymnastic skills learned in a tumbling program, adventure activities offer children the opportunity to develop cooperation, trust, and problem solving skills. These skills, in turn, may enhance the caliber of children's performance in organized sports.

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School Programs

"Katy Outdoor Learning Center: An Innovation in Education," *The Classroom Teacher*, vol. 2, no. 5, March/April 1983, pp. 20-21.

Katy Outdoor Learning Center

An Innovation In Education

In the Katy ISD, there is a classroom lined with winding nature trails, a gently flowing creek, and all manner of trees, flowers, animals and insects. This classroom, of course, is not confined within the four walls of any building; it is the Katy Outdoor Learning Center (OLC), one of the most innovative educational facilities for pre-college students in the state.

First opened in October 1981, the center is located on 34 acres of what was once rich rice farming land. Used by all Katy students, from kindergarten through secondary, the center's features include nearly a mile of nature trails, an active creek, a duck pond, a gardening area, and many species of plant and animal life. The starting point for most activities within the center is a modern educational building — opened in February 1982 — which provides space for indoor learning activities and houses numerous educational exhibits, a kitchen, and offices.

The OLC director is Kenneth Welch, formerly principal at Katy Junior High, and an avid naturalist. He is assisted by Ray Wolman, a Katy High School teacher who divides his time among two biology honors classes and working at the center.

At first glance, the OLC might appear to be designed exclusively for science education. It is used, however, by students learning a wide range of disciplines, from language arts to math and social studies.

"One student might come here to do a science project and come back later in a creative writing class," Mr. Welch explained.

While kindergarten and first grade classes are limited to a basic introductory program, students in grades two through twelve can participate in a variety of activities. Curriculum guides, one each for levels K-5 and 6-12, were prepared for the center to offer teachers activities which can fit into their existing units. At least three different activities are offered for each grade level, and teachers may choose from those available, or one may be developed from their own lesson plans.

In each case, once the subject area is decided upon and a visit is scheduled, an activity information packet is assembled for use by the class. The teacher is given general information to prepare the students in advance so that time actually spent at the center can be devoted to learning activities rather than explaining the rules and procedures for using the OLC.

Paula Foore, who teaches life sciences at Memorial Parkway Junior High, recently took her seventh graders to the center for a project in herb growing, combined with a general study of plant and animal life in the area. The students were divided into two groups. While one worked with Ms. Foore on the herb unit, the other group walked the nature trails with Mr. Wolman, who explained the various designated "points of interest," such as a particular type of shrub, a creek, or an active hive of honey bees. Midway through their visit, the groups switched activities so that each student was able to participate in both projects.

After their visits, teachers are asked to evaluate the activities in which their students participated, and offer suggestions for improvement of the curriculum or ideas for future activities.

Those closely involved with the program say that the OLC has drawn virtually universal support from the district's educators.

Mr. Wolman, who hopes eventually to work full-time at the center, makes no secret of his enthusiasm.

"This is a biology teacher's dream," he said.

"We have never had a teacher or student use the center who didn't have good things to say about it," said Dr. Genevieve Mandina, Katy ISD assistant superintendent for curriculum and instruction.

When planning for the center started about three years ago, Katy ISD educators had very little information with which to work. There were few precedents, and other outdoor centers in Texas did not quite fit the mold envisioned for the Katy OLC.

"We talked about a program that would teach good citizenship and the value of nature," Dr. Mandina said.

Katy representatives visited similar facilities which they found were limited to certain grade levels and usually offered only a one-time, four-day campout program. Katy educators wanted a facility that would serve students in all grades year round. To develop the Katy OLC program, a curriculum writing committee was formed. Information on outdoor learning was provided by the Texas Education Agency and curriculum experts, and naturalists were consulted to help classify

Photos: Above left, resource teacher Pat Piper, left, students Raylyn Kelly, right, and Chris Isget check garden vegetables. Right, student examines OLC exhibits.

plant and animal life found on the 34-acre site.

During the 1981-82 school year, nearly 5,000 students used the OLC, and Katy school officials expect 7,000 students to use the facility during the current school year.

"Our original plan was to have all students in the district use it at least one time during the year," Mr. Welch said.

But with a scholastic population of 13,000, and unpredictable weather to contend with, the Katy ISD worked out a schedule to target certain grade levels and subject areas, giving each student in the district the best possible opportunity to use the OLC from year to year.

Seventh grade science teacher Paula Foore teaches herb unit.

Future plans include a community museum and a blacksmith shop — combined with a caretaker's cottage — to be built on the site. For next fall, the Katy school board recently approved a new elective course for grades 11 and 12 entitled "Outdoor Adventure," to include the teaching of pioneer arts and crafts, survival, outdoor cooking, and numerous other skills.

Seventh grade Texas history students will be able to participate in an unusual program which will utilize artifacts from the Texas Revolutionary War era. The artifacts will be kept in a special "history trunk" at the OLC. Two interpreters — one man and one woman — specially trained by the Harris County Heritage Society, will use the artifacts to illustrate the daily life of early Texas settlers. Dressed in frontier costumes, the interpreters will act out their scenario for students as if they were actually living during the Texas pioneer era.

In addition to its innovative place in the Katy public school curriculum, the OLC has been used in other activities, including an outdoor recreational program held last summer for 145 elementary students, and the Katy community education program for adults. The OLC program has drawn enthusiastic support from the community, and many of the exhibits at the center, including the favorite of many students — a tame raccoon named "Rocky" — have been donated by Katy parents and other residents.

The concept of using educational facilities like the Katy OLC is based upon research which shows that "people are concerned about teaching values and lifelong skills — not just cognitive skills — in the classroom," Dr. Mandina explained.

Teaching students responsibility toward nature and the environment is a major part of the program, Mr. Welch noted.

"If the students of today don't assume this responsibility, then what is going to be left for *their* children," he said. ■

Biology teacher Ray Wolman checks creek water sample.

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CARROT AND STICK ENVIRONMENTAL EDUCATION

by Ralph Rogers, Winifred Public Schools, Winifred, MT

Winifred is a town of approximately 500 residents in north central Montana; historical rumor has it named after the daughter of the engineer who brought the first train into the growing community. Today the highway and all other pavement ends several hundred yards south of town and there are only small gravel roads leading through and out the other side. People here often refer to the "end of the road existence," 40 miles from the nearest medical doctor, movie, pizza, or haircut.

Many students travel 35 miles or more to school and sometimes "stay in" weeks at a time with friends during frequent bad winters. Kids seem to belong to the community as a whole and are welcome in anyone's home. The town gives a stable, family type feeling which develops children who have a great sense of security and self-assurance while in this environment. Winifred is undoubtedly similar to many small, rural agricultural towns and in being so may be very different from some large non-agricultural, non-isolated areas, but we both share a contemporary problem.

The Winifred school system has filled the needs of this community well for 70 years with little change, operating with a traditional curriculum dictated by a secure agricultural economy. Until a few years ago, most graduates could expect to find a place on the family farm or in local farm service in a growing and sometimes thriving agribusiness. Beginning in the mid-seventies, the number of young adults unable to find steady employment in farm related fields gave vivid testimony to the fact that increasing numbers of students should begin to acquire skills which would enable them to better compete outside of Winifred. This problem is not unique to farm communities, but is shared by any community with an economy which can no longer absorb new individuals whether they are construction workers, auto mechanics or in any other type of historical employment. Students could become more competitive if they could be encouraged to pursue a more academic track than is traditionally the case. Additionally, any attempt to ameliorate the problem should broaden students by exposing them to attitudes or experiences not normally encountered in the Winifred environment.

While considering these broad goals and the possible vehicles which could be used for implementation, I remembered my own days as a student and the activities which left the greatest impression . . . field trips. The information on such excursions was new and came in all forms; it could be felt, smelled, looked at, listened to and on occasion tasted. There were people there who for a brief time were more interesting to listen to than my usual teacher. The most memorable field trips involved recreational as well as academic aspects, and were invariably held outside . . . though not labeled as such in those days, these were the all too infrequent encounters with outdoor education.

The use of an outdoor education unit would also allow me to address another need I was surprised to discover here in Winifred. A large proportion of the students even in this rural, isolated setting demonstrated a need for heightened environmental awareness. When asked if they had ever seen the local sage grouse booming on their leks, or noticed the relatively common dinosaur fossils or shark's teeth in the local soils, or floated the "Wild and Scenic Missouri River" only 20 miles away, or visited Yellowstone Park 150 miles away; most answered "no." Environmental awareness cannot be subliminal. There is little effective difference in the need to develop environmental consciousness in a student from Chicago who isn't generally exposed to wild areas and associated values, and in the Montana student who isn't exposed becuase his eyes have been dimmed by familiarity.

In the spring of 1980, the outdoor education unit was accepted by the Winifred school board for implementation the following year. The unit would be offered in the spring semester to students enrolled in third year optional Biology II courses if they had successfully completed the 1st semester (human anatomy and physiology). The unit would include academic research and after-school recreational activities in the Winifred area, and would be culminated on a 4 day, 60 mile float of Montana's Smith River. Students who enrolled in 4th year optional courses (chemistry-physics) would be allowed to float the river a second time. The recreational aspects would hopefully entice students to enroll in the optional sciences while the unit itself would provide opportunity for hands-on field research resulting in the collection of original data.

The basic organization of the unit has changed little since its conception. The unit is introduced through a handout which lists and explains all the various activities in which the student will be involved during the course of the semester; the handout makes a distinction between recreational and academic activities, and each is labeled as being mandatory or optional.

During the first weeks of the unit, students are involved in an introductory level survey of all the activities. Recreational and academic activities are introduced simultaneously and are generally limited to the classroom by January Montana weather. Students are introduced to the types of research and various academic disciplines which can be dealt with along the Smith River involving small mammals, fur bearers, birds, trees, aquatic invertebrates, fish and other members of an endless list. During this introductory phase, they will be asked to choose a subject from these options upon which they will specialize. Once their subject is chosen we design, together, a complete outline of the research they hope to accomplish, and a list of questions, the answers to which will guide the student into a mastery of his chosen study. A partial example list of the topic questions for the study of fur bearers is found below.

1. What members of the fur bearer's group can be found along the Smith River?
2. What orders do the various members of this group belong to? What are the characteristics of those orders?
3. What are the natural histories of the members of this group?
4. In what habitat types will the individual fur bearers be found? What are the critical indicator species of these habitat types?
5. What is the importance of the fur industry (in dollars) to Montana?
6. What are the current fur management techniques used in Montana?
7. What are the components of the current controversy over "leg-hold trapping?" What are your feelings?
8. How can a collection of tracks and other evidence of fur bearer's activities be accumulated?

As spring approaches, students spend increasing amounts of time outside learning the names of plants and birds, trapping small mammals, collecting early wildflowers or improving other skills appropriate to their research. By mid-March, there are optional after school sessions to local lakes and the Missouri River, which include canoe lessons along with more research data collection practice. Finally, around the first of May, we travel 200 miles to the head of the Smith and spend the next four days studying, camping and floating on sixty isolated miles of river. After returning home, the last few weeks of school are spent analyzing data and writing up research in technical form in preparation for a seminar in which all papers are presented to biology students and parents in formal scientific style.

The most important pre-float skill which students must acquire is the understanding and use of systematic sampling techniques, i.e. transects. Most of the river research involves a study of the changes in plants and animals found as sample plots are analyzed in increasing distances from the water. The data students collect will show that the organisms along the river are different from the ones twenty feet up the bank, and those differ from the ones up further on the hill. It is *their* data from *their* measurements; they become biologically competent. Until now "research" has been, for most, a long term library project where they studied someone else's work written up with a bunch of "..ibids.." at the bottom.

Students working on different aspects of the river habitat are put together in teams. Under these circumstances, students not only discover that the organisms differ on sample plots more distant from the river, but more importantly, that certain groups of organisms are always found together . . . dependent upon each other. They see that precipitation may be dependent upon altitude . . . that vegetation is dependent upon precipitation . . . that the types of animals present are determined by the vegetation . . . that all these things are all related, interdependent, and this realization leads to a concept of "community." Once this concept has been discovered and developed among the students, we frequently turn from biology to environmental awareness asking; "does man belong to such a community, what are the components of it, and what has he done to his natural community?" Certainly these are some of the questions which take on an entirely different meaning to a student if he answers while standing around a campfire after a day of floating, rather than answering while sitting in a classroom after reading from a text about Lake Erie.

The recreational activities follow much the same weather-dictated time frame as the academic activities with "outside" time increasing as spring draws nearer. Classroom recreational activities are used as a break from the academic studies, and include the traditional movies and readings on canoeing, camping, first aid (especially hypothermia) etc. Students use this "indoor" time to design their camp meals, prepare lists of clothing and equipment which they intend to take, learn how to read maps and use compasses, and frequently look at slides from the previous years' float trips. Short breaks in the winter allow us to move outside for such activities as the "camper's decathalon," where students compete against time in unpacking a waterproofed backpack, setting up a tent, boiling a quart of water and then packing it all back up again.

As the weather continues to improve, there are increasingly frequent after-school sessions on the local stock ponds combining canoeing lessons with the practice of other camping skills and academic sampling techniques which will be used on the river. Canoe lessons are generally a red cross beginner's course but with increased emphasis placed on river floating rather than flat water skills. All students must successfully canoe an obstacle course in a given amount of time, both solo and with their partners. The students are then given their canoeing "final" on a short twelve mile float of the local Missouri River during which they again get an opportunity to practice research and recreational techniques they will need on the Smith.

Recreational activities during the float include the obvious canoeing, fishing, camping etc., but have also been varied by the particular skills and interests of some of the chaperones who have attended during the years. The educational value of this program has been tremendously enriched by the excellence of the people willing to spend four days with us on the river: college biology professors, mountain climbers, professional ornithologists, state senators, forestry experts, and educators from both the state education agency and from the Fish and Game Dept., have all worked with these "small town" kids, exposing them to ideas and experiences impossible to present in the classroom. The students have stood around the campfire listening to bear stories from individuals who worked with grizzlies in Yellowstone National Park and listened to legislators explain recent laws passed to protect their right to float rivers such as the Smith. They have discussed their responsibilities as recreationists with regional park directors and, possibly most important, discovered that all these "experts," sometimes highly educated and from other places, are just people enjoying the river too. The experiences students receive on the Smith have been very different from those they could receive in any other way, and certainly this diversity is reinforced by the nature of the river itself.

The Smith River is one of the most beautiful and historic rivers in Montana. Having been named during the Lewis and Clark expedition in 1805, it has a very rich history of use. The floater who knows where to look will find evidence of fur trappers or Indian pictographs in some of the caves. The river is considered "beginner's" water, but there are many corners and rapids difficult enough to give the students a sense of accomplishment if navigated correctly.

The float is begun at an altitude of approximately 4500 ft. and ends 60 miles downstream at an altitude of 3500 ft. Shortly after the float's beginning, the river enters a 40 mile long limestone canyon where cliffs up to 1200 feet rise directly from the water's edge on one or the other sides. Students studying changes in plant and animal communities can find great diversity simply by walking up the rather steep hills along the river, or by comparing the top of the river with the bottom; during this time of the spring, flowers just emerging at the top of the river will be in full bloom along the bottom. As the float nears its end, the character of the river changes from an isolated mountain stream, almost devoid of the evidences of man, to rolling irrigated hay fields, sheep ranches and a highway which parallels the last five or so miles . . . back to civilization.

Many of the goals identified for the unit as a whole are difficult to evaluate; it is difficult to see if any permanent impact has been made upon the student until he becomes an adult, voting and expressing other evidences of free choice. There are, however, some short term changes which are very measurable. We wanted the unit attractive enough to entice more students into the advanced optional science classes, the carrot and stick effect, and we wanted to see some improvement in the standardized test scores in science. To evaluate these two goals we compiled data from all classes which graduated from Winifred during the years 1970 through 1985, including 205 individuals who were full four year students. No data from transfer students were included. Comparisons were made between the number of science classes taken during the years 1970-1980, and the years 1981-1985, or pre-Smith River vs post-Smith River. Comparisons were also made between the American College Testing Program (ACT) scores made by students during the same periods.

Data evaluating the numberof students involved in optional science courses must be further divided because of a change in school board policy, effective in 1984, which mandated another year of either math or science. If the unit had achieved the goal of increasing the enrollment in science, then it should be reflected by an increase in the second period compared to the first.

a. Years 1970-1980:
151 students completed 386.5 years of science = **2.56 years/student**

b. Years 1981-1983:
46 students completed 159.5 years of science = **3.25 years/student**

Enrollment in 4th year courses has always been purely optional. The change in school board policy would have no effect on a comparison limited to 4th year classes, and data from all years would be acceptable. Students who enroll in these courses are allowed to return to the Smith simply as a reward. There are no academic activities required for participation from these students, but several have used the trip to complete extra credit research on some aspect of water chemistry. Again, achievement of the goal would be reflected by increased enrollment in the second time period.

c. Years 1970-1980:
16 of 151 students enrolled in 4th year sciences = **10.6%**

d. Years 1981-1985:
18 of 54 students enrolled in 4th year sciences = **33.3%**

Each year since the origin of the Smith trip, I have informally asked the students enrolled in these 4th year classes to indicate if returning to the river had some bearing on their decision to take the course. Through the years, most have indicated that it was a significant consideration and many, in absolute honesty, have admitted, "I'm taking chemistry so that I can float the Smith again."

The goal of increasing the students' proficiency in natural science on college board standardized exams (ACT) was tested using the same comparison time periods. Fortunately, graduating students taking the college boards have historically used the ACT and continue to do so. The ACT tests students' proficiencies in four separate categories, including "natural science," making the comparison possible.

e. Years 1970-1980:
70 of 151 graduates took the ACT scoring an average of = **52% (national percentile)** on"natural science"

f. Years 1981-1985:
37 of 54 graduates took the ACT scoring an average of = **61% (national percentile)** on "natural science"

All of the comparisons made above indicate that since the Smith River outdoor education unit became an integral part of the teaching curriculum in Winifred schools, students have enrolled in more science courses and have performed better on standardized tests. The unit has been effective . . . it also seems to be cost effective.

One of the great advantages in using the outdoor classroom is the fact that it is free. The only costs include transportation to and from the river and transportation down the river itself . . . canoes. The school has purchased no special equipment for this unit: all camping gear is owned by the students or borrowed where there are short-falls; the canoes needed for the pre-float lessons are borrowed locally. Students provide their own food and obviously can't spend money while on the river. The only expenses to the school for this four day trip have been canoe rental ($250-$300), bus driver and fuel ($200), and the cost of fuel for a second vehicle used in the shuttle of equipment from the top of the river to the bottom ($75). The annual cost for the entire program has been between $500 and $600.

It would be nice if all students came to school each day with a burning desire for knowledge and unquenchable intellectual curiosity. It would be nice if the needs of these students were always the same and could be filled using unchanged methods and curriculum. Neither case is, of course, reality. The average student just isn't interested in taking difficult optional courses explaining why big schools might have five sections of Biology I and only one section of Biology II. Many communities are in a state of flux at this time due to changing economic conditions; certainly Winifred is. Programs must be developed to fill these changing needs, and students need to be encouraged to participate. The Winifred school board has recognized the problem by increasing the graduation requirements. However, the outdoor education program was designed to go further.

We intended to get more students involved in science, to better their performances on standardized tests, to have them create and complete their own research projects and to become more aware of their environment. The success of these goals can be reduced to numbers, quantified, measured and demonstrated. What cannot be quantified is the excitement in students' faces upon returning from the river; the stories and comparisons with students who have attended previously; or the frequently expressed sentiment by students in their trip journals that this was one of the most educationally significant experiences they have every had. Students have come early to school and stayed late to practice the recreational and academic activities involved in this program, and, by giving up their weekends, have effectively lengthened their school year. Chaperones have returned from the Smith and purchased canoes. On request from the community, the recreational aspects of the trip have been repeated during the summer as an adult education class. After five years of experience with the Smith outdoor education program, the school board has recently approved a three day earth science/outdoor education trip to Yellowstone. By any measure, the use of outdoor education programs has been well accepted here and has helped fill the changing needs of Winifred students.

OUTDOOR ADVENTURE EDUCATION COURSE
LAKE FOREST HIGH SCHOOL
LAKE FOREST, ILLINOIS
LLOYD A. ATWELL

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Lake Forest High School is in the combined communities of Lake Forest, Lake Bluff, and Knollwood. The communities have a combined population of about 30,000. The school's enrollment for the 1985-86 school year was 1250 students.

The Outdoor Adventure program was started in 1975 as part of the physical education curriculum. In 1975, Lake Forest High School had an enrollment of over 1900 and offered two classes of outdoor education per semester. By 1985, our school's enrollment had dropped to 1250 and we offer six classes of outdoor education per semester. In 1982, we began preparing and programming a second teacher for our outdoor education courses, Mr. Mark Samuels. In 1983, we began offering an advanced class in outdoor education and each semester we have offered either one, two, or three classes of Outdoor Education II.

We have had a number of students who have studied for and are now working in the outdoor education, outdoor recreation, or related fields. Through the use of outdoor and experiencial activities, our students learn not only the skills necessary to perform different activities, but they learn to understand their capabilities, their strengths and weaknesses, and they also learn, in a positive manner, about the strengths and weaknesses of those around them. Success is also found through a comprehensive self-evaluation at the conclusion of the course. The impact of the course is also evident, we are told by our Guidance Department, by the number of students who write about their outdoor education experience in their college application letter.

Our philosophy is that Outdoor Adventure Education should be an educational experience of some self-discovery which uses challenges found in a more natural setting. What this means is using "action-oriented" activities to attain behavioral and educational objectives. The educational process should be concerned with participation and cooperation in decision making and problem solving as students go through the process of learning about themselves and responding to their environment. The student is placed in situations where learning is through direct experience and where what is learned is immediately tested and, if workable, reinforced through achievements and successes.

The underlying educational philosophy of our Lake Forest High School program should be identified primarily through the vehicle of an extended outdoor experience where physically demanding and some shared "stressful" experiences are used to stimulate personal growth, interpersonal effectiveness, and the discovery of one's effectiveness to the environment.

cmw2

Need

1. Individual Needs

Experience in the physical world to offset and give meaning to life in a technological society.

Sense of Worth of dignity without which man cannot function effectively in any society.

A Variety of Stimuli to combat a weary sameness in physical setting, people seen, and daily schedule.

Humility toward others through understanding oneself and sharing with others.

2. Using U.S. Government statistics, we find that one in four American adults participates on a regular basis in outdoor recreational sports (fishing, camping, boating, and hunting). With this in mind, we feel it only appropriate that our physical education program here at Lake Forest reflect this need to give students the opportunity to learn skills they very well may have an opportunity to use in later life.

Objectives

The program should be:

1. A culminating experience
2. Interdisciplinary
3. An exercise in higher levels of thinking
4. Relevant directly or indirectly to one's life style
5. An opportunity to develop and clarify values
6. An evaluation of individual emotions, attitudes, and values
7. To nurture the self concept and growth
8. A high impact experience
9. Personal objectives through development of:
    a. Interpersonal effectiveness
    b. Enhancing the self concept
    c. Environmental awareness
    d. Understanding values
    e. Responsibility
    f. Physical challenge
    g. Shared stress experiences
    h. Spontaneous self giving
    i. Service to others

Goals

1. To relate how the natural environment, even around our community, can be used to further appreciate education and safety of the out-of-doors.

2. To master many of the skills necessary to live and survive in the natural environment thereby gaining the resourcefulness and confidence necessary to impart this knowledge to others.

3. To organize and run a successful survival wilderness living, hiking, back-packing, etc., outdoor education program.

4. To help achieve a greater understanding and appreciation of the world around us.

5. To promote better association and communication between students and teachers -- interaction.

Value to the Students

As a consequence of participation in the outdoor adventure education activities the students will learn to perceive themselves individually as more active, stronger, and more positive. The student should demonstrate a greater capacity to see other people as individuals and a greater tendency to view peers and teachers as more positive and helpful. The students should also show a more mature goal orientation and greater flexibility of means for goal achievement.

A majority of students should acquire a more positive self-image, realize they could do "real work" and take actual responsibility for shaping their own education, and have an opportunity to come to trust and care for other people.

Value to the School and Community

In schools were outdoor adventure education programs have been implemented, parents have been overwhelmingly supportive. Several referred specifically to increased maturity in children, their strengthened feelings of independence and self-awareness, confidence in their ability to cope with circumstances as they arose, consideration for others, and their ability to work with a group.

Though ours is not an underprivileged community, there are many lessons of life to be learned and dealt with that cannot be brought out or presented in any other way in our present educational system.

Evaluation

1. Does everyone enrolled participate?
2. Is it enjoyable?
3. Is it nature oriented?
4. Do we develop warm human relations?
5. Is it Experimenting, Exploring, Discovering, or Sensory Learning?
6. Is it a Reality?

Methods of Evaluation

1. Test
2. Photo records
3. Anecdotal records
4. Evaluation by students, teachers, and parents.

One of my goals is to help other schools design their own Outdoor Education program. We here at Lake Forest High School have seen the value of the program. We have seen how it can help our students grow within the school and the community and we would enjoy helping other school districts design their own program. We are currently helping two neighboring school districts start their own Outdoor Education program.

Contact Persons:

Dr. Robert Metcalf, Supt.

Mrs. Gayla Clemons, Dept. Chair.

Skip Atwell, O.E. teacher

Mark Samuels, O.E. teacher

OUTDOOR EDUCATION

WEEKS	CURRICULUM	WEEKEND OUTINGS	
AUG.			
27-29	Introduction Repelling		
SEPT.			
2-5	Climbing and repelling		
8-12	Climbing		
15-19	Climbing		
22-28	Climbing	Sept. 27	Devil's Lake
29-10/3	Cycling		
Oct.			
6-10	Cycling		Bike trip
13-17	Canoe	Oct. 17	Canoe trip
20-24	Back packing		
27-31	Maps and compass		
Nov.			
3-7	Fly and spin cast		
10-14	Riflery		
17-21	Riflery		
24-26	Diet and cooking		
Dec.			
1-5	Winter camping		
8-12	Cross Country		Winter campout
15-19	Cross Country		
Jan.			
5-9	Cross Country		
12-15	Finals		

SAMPLE CURRICULUM
FOR
OUTDOOR ADVENTURE EDUCATION COURSE

	Weekdays		Optional Weekend Outings
September			
2-5	Introduction--Basic Camping Backpacking Equipment	19-20	Cycling Overnight Ecology-Biology Light Hike Sensory activities Star study
8-12	Cycling		
15-19	Cycling and Camping		
22-26	Climbing		
29-10/3	Climbing		
October			
6-10	Climbing and Repelling	17,18, and 19	Climbing Canoeing--Sailing Fishing Belaying Repelling Star study
13-17	Climbing and Repelling trip planning		
20-24	Climbing		
27-31	Orienteering		
November			
3-7	Angling and Casting		
10-14	Backpacking and cooking		
17-21	First Aid		
24-26	Water Safety		
December			
1-5	Winter Camping	5-6	Winter Camping overnight Star study Orienteering
8-12	Shooting (riflery)		
15-19	Shooting		
January			
5-9	Cross Country Skiing		
12-16	Cross Country Skiing and Snowshoeing		
19-23	Testing and Wrap up		

SPRING SEMESTER 1985

OUTDOOR ADVENTURE EDUCATION CURRICULUM

	Weekdays		Weekend Outings
February			
31-4	Introduction & Cross Country Skiing		
7-11	Cross Country Skiing		
14-18	Cross Country Skiing & Snowshoeing		
21-25	Riflery		
March			
28-4	Riflery & Casting and Angling		
7-11	Winter Camping		
14-18	Conservation of Energy and Diet		
21-25	Backpacking and Equipment		
28-1	First Aid		
April			
4-8	No School		
11-15	Map and Compass		
18-22	Climbing		
25-29	Climbing		
May			
2-6	Climbing	20-21-22	Climbing
9-13	Climbing		Repelling
16-20	Climbing		Sensory Activities
23-27	Cycling		Star Study
30-3	Cycling	30-3	Cycling Overnight
			Ecology-Biology
June			Sensory Activities
			Light Hike
6-10	Wrap-up		

SAMPLE
DAY TO DAY COURSE OUTLINE AND PROGRESSION OF ACTIVITIES

Bicycling

Sept.	2	Introduction, rules and regulations, responsibilities, requirements equipment, schedule, discussion of schedule
	3.	Discuss equipment for those about to buy, collect permission slips, hand out material
	4	Cycling Introduction
	5.	Check bicycles for safety equipment and necessary repairs
		Start breakdown of example like:
	8	Take apart a bike
	9	Clean bike
	10	Put bike together
	11	Safety check
	12	Camp out organization
	15	Safety ride
	16	Community ride
	17	Country ride
	18	Town ride
	19	Pack for trip

Backpacking

Sept.	20	Backpacking, hiking, backpacks, rucksacks, daypacks, boots
	23	Tents and sleeping bags
	24	Clothing
	25	Foul weather--rain, wet, cold--hypothermia
	26	Cooking, stoves, fires

Climbing

Sept.	29	Introduction to climbing, equipment and safety
	30	Knots and Command
Oct.	1	Climb bleachers, belaying, falling
	2	Climb wall--belaying
	3	Climb wall--belaying
	6	Climb and repelling
	7	Climbing hazards - climbing
	8	Types of climbs - climbing
	9	Degrees of difficulty - climbing
	10	Plan for trip
	13	Hazards in climbing--climbing, repelling
	14	Weather--climbing, repelling
	15	Climbing
	16	Climbing
	17	Pack for trip

Orienteering

Oct.	20	Introduction and compass - stride
	21	Map - types and legend
	22	Map and compass together
	23	Outdoor problems
	24	Orienteering game

Archery

Oct.	27	Introduction, nomenclature, equipment and safety
	28	Short Range shooting
	29	Long Range shooting
	30	Short and Long Range shooting, Field Shooting Hunting and Fishing with Bow and Arrow
	31	Contest

Fishing

Nov.	3	Introduction, nomenclature, safety, types of fishing
	4	Fly Fishing Technique
	5	Bait Casting Technique Spin Casting Technique
	6	Conservation -- Outside Speaker -- Movie
	7	Game

Indoor Climbing

Nov.	10	Review, equipment, procedures, safety commands
	12	Climbing
	12	Repelling
	13	Technical - Physical
	14	Climbing
	17	Rope Work, challenges, introduction
	18	Indoor Climb
	19	Indoor Climb
	20	Indoor Climb
	21	Indoor Climb

Winter Camping

Dec.	1	Introduction, Hypothermia, Frostbite Movie on winter exposure, camping, etc.
	2	Discussion of equipment, tents and sleeping bags
	3	Plan for camp out
	4	Clothing
	5	Prepare for camp out

Shooting (Riflery)

Dec.	8	Introduction, safety, Guns and Shooting, nomenclature
	9	Shooting Introduction -- Outside Speaker
	10	Shooting, types and position
	11	Shooting
	12	Match

Cross Country Skiing

Jan.	5	Introduction, nomenclature, sizing, history, movie
	6	Turning, kick turn, use of pole, Diagonal Stride
	7	Straight running, use of pole
	8	Uphill, straight herringbone, side step, down hill
	9	Uphill, down hill, turning
	12	Snow shoeing, types, uses, history
	13	Hiking
	14	Cross country jogging
	15	Cross country trip
	16	Cross country trip

NUMBER & TYPE OF OUTDOOR EDUCATION FIELD EXPERIENCE

1. Devils Lake trip
    A. 3 days and 3 nights
    B. Curriculum
        (1) Climbing
        (2) Repelling
        (3) Obstacle Course
        (4) Caving
        (5) Sensitivity work
        (6) Camping and cooking
    C. Maximum of 25 students
    D. 3 trip leaders - male and female

2. Winter mountaineering trip

    A. 2 days - 1 or 2 nights
    B. Curriculum
        (1) Equipment preparation for winter camping
        (2) Cold weather camping and cooking
        (3) Snow shelters
        (4) Cross-country skiing
        (5) Showshoeing
    C. Maximum of 25 students
    D. 2-3 trip leaders - male/or trip leaders

3. Bike trip

    A. 1 night - 1 day (their has been student request for additional time)
    B. Curriculum
        (1) 20 to 60 mile ride
        (2) Bike preparation
        (3) Camping and cooking
        (4) Night sensitivity work
    C. 12 - 20 students
    D. Maximum 1-2 instructors (one to drive the station wagon, i.e., car that carries repairs, equipment and supplies.)

4. Canoe trip

    A. 1-2 nights and 1-2 days
    B. Curriculum
        (1) Equipment preparation
        (2) Canoeing instruction
        (3) Canoe trip
        (4) Camping and cooking
        (5) Water safety
    C. Maximum 20 students
    D. 2 instructors

Science Every Minute of the Day

by

Calvert Hydes, Principal

Wheatley Elementary School

Reprinted by permission of Calvert E. Hydes, Wheatley Elementary School, Louisville, KY.

Submitted to the National Science Teachers Association
1985 STAR Awards Committee

October 15, 1984

It is 8:00 a.m., an hour before the school day begins. Most of the staff have not yet arrived. The school doors open and children begin to wander into the school in groups of two and three. "Look at that spider," says one child. "That's nothing, did you see the snake eat that worm?," says another. Others are engaged quietly in observing the mother mouse feed her newborn babies. Some have opened books that are lying on the tables in front of exhibits and are reading about the animal in front of them.

By now, several parents have entered the school and are also busy inspecting the items that are on display. "That's a hamster not a gerbil," instructs one parent to her kindergartener. Attention is attracted as the rooster gives his good morning crow then jumps up on the windowsill for a handout. You may think that this scene is taking place in a rural setting. Actually, it occurs daily at an inner city public school and is part of a non-directed, hands-on approach to the school's science instruction. The program's developer and "prime mover" is the principal.

Wheatley Elementary is an inner city school in Louisville, Kentucky. It is located in an area characterized by high crime and low income. Since the school is designated as a central school in a cluster of schools in the local school district desegregation plan, students in the surrounding community are exchanged with students from four other schools around the county. Some of these schools are as much as twenty miles away. This distance to school and its location has caused some apprehension on the part of parents and has created some problems in parental support for P.T.A. and other school activities.

In addition to the problem of a constantly changing student enrollment, other factors such as low self esteem of some students, poor attendance, and limited male role models, have helped to shape the direction of Wheatley's recent science program. The principal recognized that any changes made needed the support of an already hardworking staff and that these changes should require little additional work for the classroom teacher.

To address all of these concerns, the following program was developed. It was hoped that this program would create learning experiences for children in a school atmosphere that was warm, friendly and exciting, would bolster self-esteem, and would help to improve attendance.

The Nature Center

The first phase of the plan was the establishment of a nature center. Located in the main hall, next to the cafeteria, it is in an area that is passed by all students sometime during the day. The exhibit is composed of an assortment of aquariums, terrariums, cages and displays of plants and animals. Various other exhibits of non-living items, such as posters, preserved and mounted specimens, rocks and minerals, and models complete the nature center. All of the items are rotated continually to create a fresh-looking display and children, parents, and staff are encouraged to donate or lend items. This causes subtle changes day by day: a new exhibit is set up; there is the birth of a pet; the eating habits of some creature are noticed, or a flower blooms. Student patience and careful observation begin to have their rewards.

The uses of the exhibit are many and varied. Teachers bring an entire class to the nature center for lessons. Video tapes of the live materials, habitat, and care have been produced and broadcast through the school's closed circuit television system. Items can be taken from the center and kept in the classroom for periods of time. Many of the items may be touched or petted. Books and other descriptive materials are available and usually checked out with the specimens.

The exhibit has been set up by the principal and students. No one is required to teach a unit using the center. It is there as a resource and for all to enjoy.

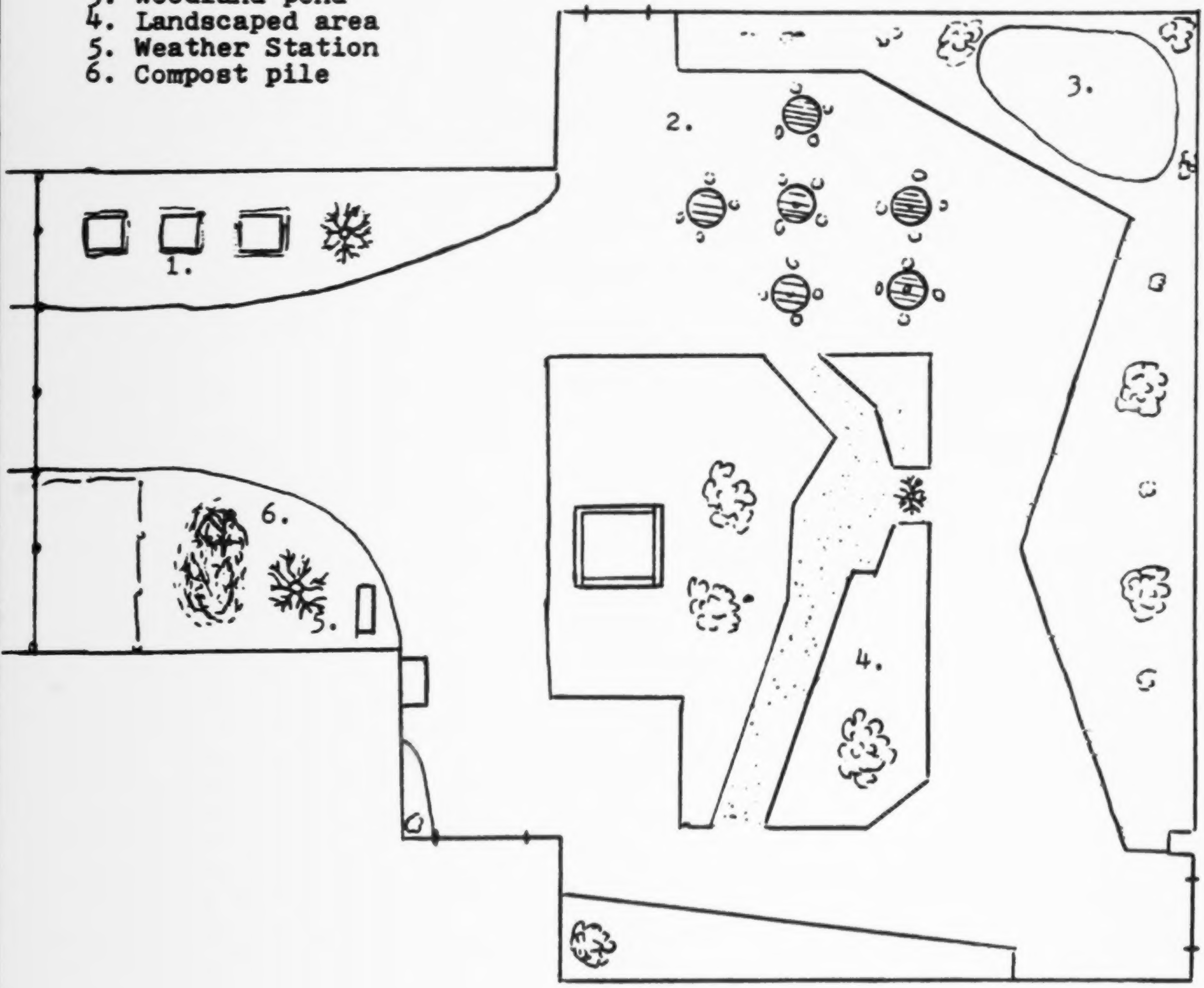
The Environmental Classroom

The school building is horseshoe shaped with a courtyard in the center. This courtyard area is designated as an environmental classroom and is used in several ways. Large spools donated by the local utility company have been set up as tables to accommodate entire classes. Benches have been made from logs. This area can be used for instruction and/or lunch.

Another section has been converted into a small woodland

Sketch of Environmental Classroom

1. Classroom garden plots
2. Tables for instruction or lunch
3. Woodland pond
4. Landscaped area
5. Weather Station
6. Compost pile



pond. The pool is stocked with native species which include fish, reptiles, amphibians, mollusks and crustaceans. The perimeter area has been allowed to "revert to nature", weeds and all. The woodland pond was built with a combination of efforts. The school systems grounds crew dug the ten by twelve by two foot hole. The PTA provided the funds to purchase a roll of black plastic film for a liner. Members of the staff cut and fitted the plastic, filled the pool and lined the edge with rocks collected from various roadside outcrops and creek bottoms. Mother Nature took care of the trees, weeds, and flowers growing around the pond.

In an urban setting this provides some unique instructional opportunities. For example, without going on an extended and expensive field trip, the children can observe a mini ecosystem. Mosquito larvae in the pool are eaten by the fish. Box turtles eat the plants growing around the pond. Knowledge of how camouflage aids animals is gained as students look for the reptiles and amphibians that they have seen and put there. Quiet, patient observation has its rewards.

A third section is more of a formal garden which is being landscaped as funds are available. Currently, a gravel path winds across the area. Railroad ties, salvaged from a parking lot renovation project, were used to border the walk. Ground cover has been planted next to the wooden border. Benches have been made from the ties and treated lumber purchased from a local lumber company. A small tree has been planted with the hopes that it will someday provide shade. A fourth section is devoted to garden plots for individual classes to plant as they wish. Vegetable gardens seem to be the most popular.

In addition to the wildlife in and around the pond, there is a resident rooster named "Roto" and two pet rabbits named "Bugs" and "Thumper". All three creatures have free run of the area. They forage from the plants living in the enclosure and are cared for by members of the nature club and other staff members.

Efforts have been made to attract birds with the use of student-constructed feeders. One type of bird feeder was made from stale ice cream cones donated by a local manufacturer. The children filled them with a mixture of peanut butter and birdseed. Pinecones collected from one of our overnight camping trips were also filled with the mixture. The children's efforts have been rewarded. Any time of the day, a variety of birds can be seen visiting the feeders and the pool. Some of the birds have nested within the courtyard and their nesting area has been observed. Last spring, babies were raised in two nests.

The upkeep of the nature center and the environmental classroom has been accomplished with a combination of efforts. The school's P.T.A. provides the funds to purchase pet supplies, landscaping materials and garden tools. The older students who volunteer are members of a Nature Club. Any student in grades four or five may participate. Members must have a signed permission slip from parents and must keep up their school work. Directed by the principal, the club is divided into three groups. Each group meets one day each week for an hour. Activities of this club include learning the proper care and maintenance of the plants and animals, nature studies, and guest speakers.

A senior citizen job training program and volunteers also contribute to the overall management and care of the nature center and environmental classroom. The senior citizen trainee is paid by the senior citizen job training program to work a half a day, five days a week. The purpose of this program is to develop job skills that are marketable. When possible, these trainees are hired by the training institution.

Wheatley's nature center caretaker is a member of the American Association of Retired Persons (AARP). Working four hours a day five days a week, his primary responsibilities include the total upkeep of all plants, animals, material, and equipment. It takes several hours just to feed, water, and clean the cages and filters.

Two-thirds of all the food used to feed the animals is raised or caught at the school. Crickets, isopods, worms, wax worm larvae and flies are carefully nurtured in a storeroom near the nature center in the hallway. Moths are collected daily by placing a funnel in the the mouth of a narrow-necked bottle. The collecting device is then set out near an outside light every afternoon. The following morning an ample supply of moths trapped inside the jar is used to feed the frogs, lizards, and salamanders.

A third and most recent addition to the program is the establishment of a science lab/museum which can accommodate an entire class. Extra shelves from the original science storage area were moved into an empty classroom along with surplus tables and chairs from around the building. A portable science demonstration table was taken out of storage and placed in the room for class demonstrations. An overhead projector and a slide projector are kept there on a permanent basis. This room allows the teacher to have an instructional laboratory with all of the school's major pieces of science equipment readily available.

District Inservice Site

Due to the success of Wheatley's science program, the Jefferson County Public Schools uses the the school for elementary science inservice during the summer and early fall. Teachers from around the county use the facilities and have an opportunity to see what has been accomplished with limited resources.

Teacher's Creature Lending Service

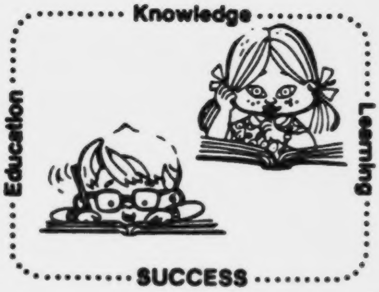
Approval of a local school system grant proposal this year has allowed Wheatley to become a live materials center. The nature center has an abundance of small reptiles, amphibians, crustaceans, mollusks, and fish native to Kentucky as well as many familiar pet shop animals. These are available for loan to any teacher. A list of available "pets" is sent out to the schools each quarter. Schools wishing to participate call in their loan requests. While arrangements must be made for the animal to be picked up by the requesting school, the pet does come with its cage, food, and instructions for proper care.

Future plans for enhancing the science program include the construction of an operating windmill and photovoltaic collectors to generate electricity, a greenhouse, and passive solar heaters for general building use. Each of these will be demonstration models for use by both students and staff as well as a resource to the school district.

The success of Wheatley's elementary science program model is due, in part, to the fact that this model is considered more of a process than a program. The center provides meaningful experiences to children and resources to teachers. Those components that prove successful will be continued or expanded, those not successful will be eliminated. This constant change stimulates interest and enthusiasm and allows for continued improvement in the model. Some view change as a problem; some view change as inevitable. For Wheatley, change is a means of preventing a static program. The variety of experiences available helps Wheatley students to be exposed to science every minute of the day.

WESTON ELEMENTARY SCHOOL

140 Polk
Greenfield, Indiana 46140



Reprinted by permission of Peter J. Fortune, Weston Elementary School, Greenfield, IN.

CONSERVATION - THE EDUCATIONAL RENAISSANCE

There is an increasing interest in using the environment as a teaching tool. It stimulates a child's natural enthusiasm and allows for the pursuit of knowledge in many subject areas. Conservation education is actually a teaching method which enhances and enriches existing school curriculums, provides for the practical application of knowledge, and makes all people aware of the essential role played by natural resources in our lives. Many schools have capitalized on this method by constructing outdoor laboratories. This experience renews enthusiasm as well as creating greater unity among teachers, students, administrators, parents, and the community.

Many educators, when faced with the possibility of a conservation education program, have some concerns. Most common among these concerns are:

- What about funding?
- What about maintenance?
- What about liability?
- What about vandalism?
- Is a lab possible on our site?
- Do we have enough knowledge of the environment?

These questions need not be stumbling blocks. Much can be accomplished without great increases in funding, maintenance, or liability. Our program is funded totally through voluntarism and donations. Our liability insurance is unchanged and the custodial staff, although part of our program, has not seen a workload increase. Vandalism has been almost nonexistent, possibly because so many people have a personal interest in the program. We have built an outstanding lab on a site that would be considered poor by most standards and few teachers have less knowledge of the environment than I had when I started this project.

Site, money, and background are not the key ingredients to a successful program. Success is spelled commitment, determination, enthusiasm, and teamwork. There are sources of guidance. Your first two contacts should be your local Soil and Water Conservation District and The Division of Forestry. These organizations, through information, planning, and in-service training, can help you find an exciting new life in your school.

Pete Fortune
National Conservation Teacher of the Year (1984)

COMMUNITY/SCHOOL DESCRIPTION

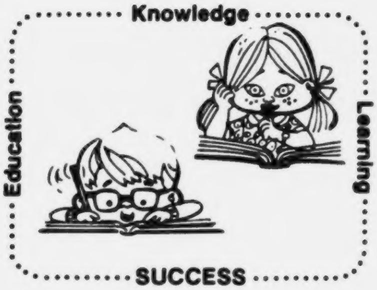
Weston Elementary School is located in Greenfield, Indiana. Weston's student population of 450 covers a wide socioeconomic range and includes all areas of special education. The school also houses the corporation's gifted program.

Greenfield is the Hancock County seat and has a population of 11,400. The city is located twenty miles east of Indianapolis and is known as the birthplace of Hoosier Poet, James Whitcomb Riley. In addition to Eli Lilly and Company, the city's largest employer, Greenfield is the home of some light industry.

NOTE

This program is being duplicated by schools, in a variety of communities, throughout the corporation, county, state, and country.

WESTON ELEMENTARY SCHOOL
140 Polk
Greenfield, Indiana 46140



We have made numerous presentations about our conservation education program. This experience has demonstrated, to us, that nothing moves an audience like pictures of our students. Spectators, no matter what their background, are impressed, motivated, and encouraged when they see children actively involved in learning through real life situations.

We believe the inclusion of our lab and students in commercials can be an effective marketing force. Additionally, it could stimulate greater public understanding of conservation resulting in positive rewards for humanity.

Following is a description of the Weston conservation education program.

THE WESTON PHILOSOPHY

At Weston, we are conservationists. We believe that our technology and quality standard of life depend upon our natural resources. These resources need wise management so our quality standard of life will continue. Management, in our eyes, means using resources while protecting them; just as a farmer uses soil to grow food and guards against erosion by utilizing no till planting.

For us, conservation is also a dynamic teaching method which allows for the lowest achiever as well as the most gifted child. An important aspect of this methodology is direct student involvement in planning, creating, maintaining, and using outdoor laboratory facilities. When this type of approach is used, children see a practical purpose for education as they confront real life situations, develop thinking skills, and learn a variety of subjects enthusiastically.

Additionally, when children participate in such special projects they gain an appreciation for the freedom, democracy, and resources of this great nation. They begin developing an awareness of their rights and responsibilities while seeing the future as a great opportunity.

PROGRAM OBJECTIVES

We felt a need to strengthen and expand science education in our school. We wanted to develop a program that would:

- Create greater student interest and enthusiasm for science.
- Create greater student appreciation of the United States and its resources.
- Provide the opportunity for children to actively participate in identification and resolution of real problems affecting the environment.
- Provide a practical purpose for learning in all areas of the curriculum.
- Be useable for all areas and grade levels.
- Help the children develop an inquisitiveness leading to a basic understanding of scientific procedure.
- Act as a readiness program for more sophisticated science classes.

PROGRAM DESCRIPTION

The environmental program has been designed for use by all grade levels including regular education, art, music, band, special education, and gifted classes. It was established to coincide with and be part of the existing corporation curriculum. This project provides a practical purpose for learning as well as stimulates new enthusiasm for students, teachers, administrators, parents, and the community.

A major part of our program has been the development and use of an outdoor lab. Among the numerous lab features are:

- Pond
- Woodland Plot
- Prairie Plot
- Allelopathic Test Plot
- Wildlife Shrubs
- Compass Course
- Tree Seedling Nursery
- Arboretum
- Succession Plot
- Agriculture Plot
- Wildlife Food Plot
- Flower Garden
- Windbreak
- Herbacious Plantings
- Erosion Control Demonstration
- Ground Water Monitoring Hole

Support in various forms has come from these and other groups:

- Colleges
- Teachers
- Parents
- Local City Agencies
- Department of Education
- Soil Conservation Service
- Soil and Water Conservation Districts
- Department of Natural Resources

Even with this cooperative support, the children have been the single greatest natural resource for this adventure. Students have been involved in all aspects of the project's development including:

* Planting
* Transplanting
* Creation of Habitats
* Crop Rotation
* Moving Topsoil
* Introducing Life Forms to the Lab
* Establishing Ground Water Monitoring
* Reforestation
* Recycling
* Erosion Control Practices

The work in these areas has provided children with first hand experience in numerous areas such as:

* Scientific Investigation
* Problem Solving
* Hypothosizing
* Predicting
* Values Clarification
* Selling Crops
* Habitats
* Erosion
* Multiple Land Use and Planning
* Issues
* Identification of Variables
* Interdependence
* Decision Making
* Use of Herbicides
* Limiting Factors
* Effects of Pests on Agriculture

All of this has been accomplished without the use of tax dollars. The project has been developed and is supported by voluntarism including educational student money making projects.

PROGRAM HISTORY

Winter 1981	* Proposal Prepared
June 1982	* Unanimous School Board Acceptance
July 1982	* Pond Construction Began
Spring 1983	* Pond Completed
Summer 1983	* Continued Lab Development
November 1983	* Teacher In-service and Resource Area Established
March 1984	* Pete Fortune Named State Conservation Teacher of the Year, Program #1 in State
June 1984	* Pete Fortune Named Regional Conservation Teacher of the Year, Program #1 in Region
Summer 1984	* Lab Development Continued
September 1984	* Hosted County Workshop
October 1984	* Pete Fortune Named National Conservation Teacher of the Year, Program #1 in Nation
	* Highlight of RC&D Teacher Tour
November 1984	* Indiana Tree Farm Committee Names Lab "Outstanding Outdoor Lab" in State
March 1985	* State Legislature Recognizes Pete´s Work
Spring/Summer 1985	* Exciting Lab Developments Continued

1984 WINNERS

The Best Conservation Education Programs in America

SPONSORED BY

NATIONAL ASSOCIATION OF CONSERVATION DISTRICTS

AND ALLIS-CHALMERS CORPORATION

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National Teacher of the Year

1st PLACE AWARD

North Central Regional Winner

Peter Fortune and students celebrate the corn harvest in their outdoor classroom.

Peter J. Fortune

Weston Elementary School

Greenfield, Indiana

"Children have a natural enthusiasm for the environment . . . Our outdoor lab's greatest contribution has been to excite children about learning," says Peter Fortune, Fifth Grade teacher in Greenfield, Indiana. "Even low achievers are capable of more when motivated by mother nature."

During 1983, Fortune and his students transformed a small school courtyard into a diverse natural environment which serves as a teaching tool for all the teachers and students in the school building. One evaluator called it "the most unique and impressive outdoor classroom in the state of Indiana."

The small, enclosed rectangular area is packed corner to corner. It holds a pond, woodland, wildflower and prairie plots, a herb garden, agricultural plot, nesting boxes, sundial, and ground water monitoring hole — each of which involved efforts from the children.

Everything from a dead fish to turtles and birds is used to study habitats, interdependence, and limiting factors for wildlife. "Do animals really **like** this stuff?" asked one student who looked at grain through a microscope. "Why don't some seeds sprout?" is a live puzzle for children who are working on getting prairie flower seeds to live in their plot. Planting winter wheat and harvesting soybeans help students understand the fundamentals of agriculture — and the life-cycles of pests.

The outdoor laboratory brings new life to every aspect of the curriculum. Collecting weather data and charting the levels of ground water use math skills. The construction of a radio telescope and outlet box for grow-lights gave experience in electricity and electronics. The pond was a focal point for discussing the history of water and water transportation in the area.

Based on their lab experiences, the students reach out into the community. They established a display at the public library showing the public how to bring wildlife to their yards. Several children became involved in community reforestation and nature park projects. Alerted to conservation principles, the students study their community for good and bad examples of home site choices, overgrazing of land, and erosion control for waterways.

Peter Fortune is extending the philosophy of conservation from the school into the community by his own efforts as well. He has traveled many miles to give slide shows to other teachers and school administrators on how such a program could work for them. Schools all over the county are now at work on building their own outdoor classrooms. By seeking and using support from the entire school and community, Fortune has succeeded in having the school and community as a whole feel that the outdoor lab is "their lab."

"Nature is really one huge team of which we are all members being affected by one another's actions," Fortune says. "This program's emphasis on the stewardship of natural resources will live and grow forever through its children."

Peter Fortune has been teaching for 8 years, prior to which he had served as Staff Sergeant with the Army National Guard of Indiana. He has a B.S. and M.A. degree from Ball State University in Indiana. His nomination was sponsored by the Hancock County Soil & Water Conservation District, 141 Green Meadows Drive, Suite #1, Greenfield, IN 46140.

OUTDOOR EDUCATION
AN ESSENTIAL SIXTH GRADE CURRICULUM

Jane A. Rehrer
Eastgate Middle School
4700 N.E. Parvin Rd.
Kansas City, Missouri 64156
(816) 453-2900

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Eastgate Middle School, Kansas City, MO.**

OUTDOOR EDUCATION--AN ESSENTIAL SIXTH GRADE CURRICULUM

Our Outdoor Education Curriculum developed out of a need for an all day activity that would be an extension of our sixth grade science curriculum at Eastgate Middle School.

Eastgate is located in Kansas City, Missouri and contains a mixture of suburban and inner-city youth. Our three hundred sixth grade students range in age from eleven to thirteen.

The Missouri Department of Conservation provided the guidance and leadership for developing the guidelines for Eastgate's Outdoor Education program. The first year their Conservation Education Consultant, Jim Pyland, and Outdoor Skills Education Specialist, Jeanne Marolf, met with the principal, Dwayne Glass, and the science teachers, Don Lanning and Jane Rehrer, to plan an in-service meeting with the rest of the sixth grade basic skills teachers, exploratory teachers, instructional assistants, the secretary, the nurse and the librarian. The purpose of this in-service day was not just to give everyone background information on conservation and developing an outdoor education program, but also to encourage the teachers to become more enthusiastic about taking part in an outdoor education day and to give them first-hand experience with many of the outdoor skills they would be teaching.

The main task of developing pre- and post-curriculum for the classroom was left to the sixth grade science teachers. It was decided that conservation concepts, management techniques, outdoor ethics and outdoor skills should become integral parts of this program and should serve as a basis for conservation activities for Eastgate's students at their outdoor education day. The conservation unit is eight weeks in length. Instructor modules provided by the Conservation Department served as a reference for developing specific activities and materials for the students.

Earnest Shepherd Memorial Youth Center was chosen as the location for our outdoor education program because of its closeness to Eastgate and the fact that this facility was big enough to handle 330 students.

Many meetings with the teachers were held. The name, S.O.L.A.R. Day (Student Outdoor Learning Activities Retreat), was chosen for the actual outdoor education experience. Other important matters such as choosing activities to be used, deciding on the placement of activities at Earnest Shepherd, designing the covers for student workbooks and parent handbooks, dividing students into groups, developing task cards for each activity and scheduling activities were discussed.

Students were not only involved in learning about conservation concepts and skills, but they were also involved in making the cover pages, putting the booklets together and making name tags.

The first letters to the Eastgate parents describing S.O.L.A.R. Day and asking for their assistance were sent out in March. The response from the parents was fantastic. Over 60 parents responded to this letter.

The principal and the sixth grade science teachers developed two workshops for the parents. The first of these workshops was scheduled at noon for non-working parents and in the evening for working parents. The purpose of this meeting was to familiarize parents with the program and to describe the types of jobs available for Eastgate's outdoor education program. The second meeting was held after school at Earnest Shepherd Youth Center to tour the facility and learn the location of all the activities.

Eastgate's outdoor education curriculum stresses to students the need for zero-impact, problems of littering, importance of recycling and responsibility for using our natural resources wisely. The Missouri Department of Conservation's S.P.O.R.T. (Sportsmen Protecting Our Resources Together) program is also an important part of this curriculum.

S.O.L.A.R. Day has provided a practical opportunity for youngsters to recognize and apply conservation concepts and outdoor skills learned in the classroom. Outdoor cooking, Missouri's mammals, study of reptiles, backpacking, casting and angling, nature study, archery, trapping and animal signs, forestry practices, firearms safety, use of map and compass, fisheries management, and the history of the Missouri fur trade are some examples of the topics that the students have studied.

Eastgate sixth-graders and their parents are given an attitudinal survey prior to receiving instruction in conservation. The same survey is given upon completion of the eight week conservation education program. Results have shown that students' and parents' knowledge of conservation increased significantly.

Jim Pyland wrote an article on this survey for the September, 1983, Missouri Conservationist.

Some of the questions included in this survey are listed below:

	Agree	Disagree
1. There were about 400 deer in Missouri in 1925, but today there are more than 400,000.	( )	( )
2. Wildlife biologists agree that habitat destruction--caused by housing developments, road construction, mining and other factors--has had the most harmful effect on wildlife populations.	( )	( )
3. If people would just leave wildlife alone, there would be as many animals as there were before settlers came to Missouri.	( )	( )
4. The first organized efforts to save Missouri's wildlife were started in the mid-1930s by sportsmen's organizations.	( )	( )
5. Trapping is an important part of Missouri history.	( )	( )
6. Beavers, coyotes and raccoons are becoming extinct because of trapping and hunting.	( )	( )
7. A sales tax and funds from the sale of hunting, trapping and fishing permits provide the money for wildlife conservation in Missouri.	( )	( )
8. The biggest problem facing wildlife today is legal hunting.	( )	( )
9. Wildlife habitat can only support a certain number of animals.	( )	( )
10. Legal hunting has replaced the wolf and cougar in controlling deer populations.	( )	( )
11. Missouri has an award-winning outdoor ethics program designed for citizens of all ages called S.P.O.R.T. (Sportsmen Protecting Our Resources Together).	( )	( )

Eastgate has had four S.O.L.A.R. Days. Since the first year, this conservation outdoor skills program has continued to change and grow. The Missouri Department of Conservation's hunter education certification program and an air rifle shooting program have developed as an extra-curricular activity offered to sixth grade students during the school year. An all-day aquatic education program which includes casting/angling instruction, fishing, filleting, outdoor cooking, and a fish print activity has also evolved. The Missouri Department of Conservation's student activity book *Kid's Fishing--It's Catching On*, provides the instructional base for this aquatic education program in the classroom.

The cost of this outdoor education program is paid for by a magazine subscription drive in the fall of the year sponsored by Eastgate's P.T.A. The following expense account is typical for each year's program:

1985 S.O.L.A.R. Day Expenses

Food for outdoor cooking unit	$ 53.28
Badges for teachers and assistants	14.49
Parts for air rifles	15.60
Index dividers for notebook	2.50
Photo finishing	11.59
Cups and ice for parent volunteers	6.99
3 rolls of film and 12 boxes of pellets	27.98
Wire for art activity	9.07
25 lbs. Plaster of Paris for mammal tracks	10.51
Mountain Man program (Speaker)	150.00
Reptile program (Speaker)	50.00
6 buses to Youth Center	317.50
Total	$669.51

Some items such as orienteering compasses and air rifles originally were borrowed from the Conservation Department. Each year the school spends $100.00 buying items such as these to build up the school's inventory of essential equipment so that none will have to be borrowed.

Any teachers or administrators from other districts are welcome to visit our program. I would be willing to help teachers to set up an outdoor education curriculum in their school or provide any other assistance required in helping to set up an outdoor education day.

Resources and References Used

Martin, Wayne L., S.P.O.R.T. Ethics Class, Missouri Department of Conservation, Jefferson City, Missouri, 1980.

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OUTDOOR EDUCATION

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Henderson County Schools
Hendersonville, N.C.

OUTDOOR EDUCATION

By Keg Wheeler
Health and P.E. Supervisor (Retired)
Henderson County
Hendersonville, NC

Henderson County is located in the Blue Ridge Mountains of Western North Carolina. The wide variety of flora and fauna found in our beautiful mountains make this area an ideal setting for Outdoor Education programs.

Inspired by books and articles written by Julian W. Smith, Reynold E. Carlson, George W. Donaldson and Steve Van Matre we held our first Outdoor Education session in the spring of 1977. This first session lasted one day and involved one class of fifth grade students.

Since that time we involve 120 fifth graders for three school days in the fall (October) and a new group of 120 fifth graders for three school days in the spring (May).

The setting for our Outdoor Education program is Camp Arrowhead located a few miles southwest of Tuxedo, N.C., and approximately a half hour ride on activity buses from our county schools. Camp Arrowhead offers all the ingredients for a wide variety of outdoor activities that include a beautiful pond that is ideal for studying the many fascinating facets of pond life. There are miles of mountain woodland where we set up four ten station mini-orienteering courses. Each student can take apart his own square foot of forest floor and marvel at the levels of leaf decay and new plant and insect life located in this small plot of ground. Then, of course, they try to put it back together as they found it. There are trails where we can locate many of the seasonal wild flowers that abound in our Western Carolina Mountains and study the variety of trees and leaves in their seasonal situations.

Camp Arrowhead also has a beautiful 60-foot rock face that is ideal for beginning rock climbing instruction. This activity is taught and belayed by experienced rock climbers on our staff.

The devastating effect of forest fires to flora, fauna and streams is stressed in a unit on fire safety, and the students are shown how to build a fire in the woods and how to put it out properly. This instruction is done by one of our staff who is a former Eagle Scout and experienced woodsman.

Fishing in the pond is a popular activity although the time we fish is usually the wrong time of day. Nevertheless, many of the children have never fished before and it is indeed an exciting learning experience for them.

Camp Arrowhead has also recently put in a "Ropes Course." Because of the time situation, we involve the children only in the low elements of the course; but they are definitely challenged by it, and it has added more zest to the program.

Our staff for the Outdoor Education program is composed of ten elementary physical education teachers, four classroom teachers, and usually around four or five parent volunteers, giving a ratio of approximately one adult to every seven children.

Organization for our program is very tight since we are allowed only three school days. The activity buses arrive at Camp Arrowhead at approximately 9:30, and we begin our session at 10:00. We have to finish and have them back on the buses at 2:00 in order to get them back to their schools to catch their regular school bus for home. Therefore our daily program is very structured and highly organized in order to get the following experiences into the three days.

CURRICULUM

Seasonal Wild Flowers and Trees

Pond Life

Rope Walk (Ecology)

Orienteering

Rock Climbing (Belayed)

Fire Building and Safety

Nature Scavenger Hunt

Tactile Rope Experience

Word Hike – Outdoor Vocabulary

Ropes Course

The following booklet provides a brief example of how the days are structured and organized and also lists the activities included in the curriculum.

Why Outdoor Education?

"That which can best be learned inside the classroom should be learned there. That which can best be learned in the out-of-doors through direct experience, dealing with native materials and life situations, should there be learned." (Quoted in Smith, Julian W. et al. *Outdoor Education*. Englewood Cliffs, N.J.: Prentice-Hall, 1963, p. 21.)

What Is Outdoor Education?

Education in the outdoors is making use of the natural environment for educative processes. The outdoors will be used, therefore, as a laboratory, offering opportunities for direct experiences in this environment. As a result of these experiences, we hope that those involved will develop a greater appreciation, a clearer interpretation, and a wiser use of the natural environment in achieving the purposes of education.

Henderson County Outdoor Education Program

Place – Camp Arrowhead (three days)

How Long – 10:00 to 1:30 (We will leave in time to catch bus home.)

Approximate Date – May 20-21-22 Tuesday, Wednesday, Thursday

Transportation – Two activity buses

Meal – Children bring their own lunch, or school lunch room will furnish lunches.

Clothing – Dress according to the weather: blue jeans, sneakers, bandana.

Materials each child should bring – Pad and pencil, two small plastic bags, **(do not bring knives)**, cameras if they have them.

Resource Materials

Ginn Science Program, Intermediate Level B Teacher Materials

Van Matre. *Acclimatizing*. Martinsville, Indiana: American Camping Association, 1974.

and Others

Instructors – Physical Education staff, teachers involved, guest instructors (We also need an interested parent from each class.)

Teacher's Role – This is very important!

Pre-Experience – It will be the teacher's role to prepare her class for this experience according to our curriculum guide beginning as soon as possible in the fall.

Experience – Teachers will be with their class at all times to help the instructor in any way needed and to assist in keeping the class in order.

Post Experience – This is a must if the full value of these experiences is to be realized. Remembering it through *writing* and *art* given evidence of what has been learned.

Miscellaneous suggestions for teachers

a. During the noon meal, eat with your children and see that they clean up their area thoroughly.
b. Work up a "buddy system" or some quick reliable method of checking to see if your entire class is present. This will be used several times during the day and finally when they load the bus.
c. Ask parents to fix lunches that will not spoil in case of warm weather.
d. *Have a list of students who are allergic to bee stings and make certain there is medication for them.*
e. Ask parents to check thoroughly for ticks when children get home.
f. Be consistent and follow up with directions – *important*!
g. *See that all children go to the bathroom before they leave each morning.*
h. Explain to children why we cannot permit rock throwing.
i. Urge children to dress for the weather.
j. Explain why they must not pick the wildflowers.
k. They may bring their own fishing poles if they want to.
l. Stress that we plan to leave Camp Arrowhead cleaner than we find it so please do not throw paper on the ground.

Some of the things we would like to cover:

a. Local trees – leaves and how they function (Text 1-52) and local wildflowers
b. Pond life – water cycle – food chain – inhabitants and dependents
c. Ecology – how man changes his environment (Text 327-260)
d. Food chains
e. Compass
f. Fishing
g. Basic rock climbing
h. Ropes course

Organization

Each class will be divided into two groups, approximately 15 in each group.

Class A	Group 1 Group 2	Class C	Group 5 Group 6
Class B	Group 3 Group 4	Class D	Group 7 Group 8

Classes are divided because we have found that we get more attention, less distraction and more learning from groups of 15 rather than 30.

SCHEDULE

TUESDAY

10:00 - 10:45

Group-1 (Anne) **Group-2 (Gary)** **Group 3 (Pat)** **Group 4 (Lou Ann)**

Orientation
Line Compass

Group 5 (Larry) **Group 6 (Cissy)** **Group 7 (Pat N.)** **Group 8 (June)**

Leaves
Wildflowers

10:45 - 11:30

Group 1 **Group 2** **Group 3** **Group 4**

Leaves
Wildflowers

Group 5 **Group 6** **Group 7** **Group 8**

Orientation
Line Compass

11:30 - 12:00 (LUNCH)

12:00 - 1:30

Climbing - Keg, Larry, June
Fishing - Pat N.
Word Hike - Cissy, Lou Ann

Ropes Course - Layne, Anne
Scavenger Hunt - Pat G.
Fire Building and Safety - Gary

WEDNESDAY

10:00 - 10:45

Group 1 **Group 2** **Group 3** **Group 4**

Pond Life

Group 5 **Group 6** **Group 7** **Group 8**

Rope Walk

10:45 - 11:30

Group 1	**Group 2**	**Group 3**	**Group 4**
Rope Walk			

Group 5	**Group 6**	**Group 7**	**Group 8**
Pond Life			

11:00 - 12:00 (LUNCH)

12:00 - 1:30

Climbing - Keg, Larry, June
Fishing - Pat N.
Word Hike - Cissy, Lou Ann

Ropes Course - Layne, Anne
Scavenger Hunt - Pat G.
Fire Building and Safety - Gary

THURSDAY

10:00 - 11:30

Woods Compass and Basic Knots

Group 1 **Group 3**
Course #1

Group 4 **Group 5**
Course #2

Group 7 **Group 8**
Course #3

Group 2 **Group 6**
Course #4

11:30 - 12:00 (LUNCH)

12:00 - 1:30

Climbing - Keg, Larry June
Fishing - Pat N.
Word Hike - Cissy, Lou Ann

Ropes Course - Layne, Anne
Scavenger Hunt - Pat G.
Fire Building and Safety - Gary

Evaluation

If a fifth grader's enthusiasm is any indication of the positive impact of an experience, I am convinced we have a good thing going. We worried about the tightness of the day, going right from one activity to another. We wish for a little more leisurely pace; but with the present set-up the enthusiasm remains high, and there is no time for anyone to get bored – teachers or students.

The pre-experience is a good motivator for both teacher and student. They are working and preparing for a planned experience.

The post-experience has been most gratifying. Teachers are taking advantage of students' experiences by having them *write* about their activities, send "thank you" letters, prepare class scrap books with *drawings*, and take pictures.

We, teachers and students, look forward to our fall and spring Outdoor Education program. We feel that there is learning taking place about outdoor subjects in the proper outdoor setting that will make a more lasting impression on each child than if it were done in the classroom.

District Programs

TOPEKA PUBLIC SCHOOLS

Unified School District No. 501

OUTDOOR-ENVIRONMENTAL

EDUCATION

by

Barbara J. Stanley
Consultant, O-EE

and

C. L. Kellogg
Curriculum Director

Spring, 1986

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"It's a big, wide, wonderful world out there. Let's get into it, experience it, learn about it, nurture and preserve it." This is the call of the Topeka Public Schools Outdoor-Environmental Education Program to Unified School District No. 501 students and teachers. Through the nineteen years since it was begun, the call has been received by literally thousands of students.

Environmental education has become a regular happening in the Topeka Public Schools. Each school year in USD #501, all level one, two, three, four, and six elementary students, all seventh and eighth level middle school students, all high school science students and most special education students board an Outdoor-Environmental Education bus to experience some element of the environment.

History of Program

It was not always thus. The original outdoor education program in Topeka began in 1965-66 with a limited program offered to level six teachers of the school district. Topeka had received a Title III grant to conduct an innovative and exemplary program in elementary physical education. An outgrowth of this program was an experimental recreation-education oriented summer school program in the out-of-doors in the Topeka area.

In the fall of 1966, land was leased at Jefferson Point on Perry Reservoir from the Kansas State Park Department and a limited number (twelve) of sixth grade teachers and students participated in a one-day outdoor experience. The following year, all sixth graders in Topeka participated in the program as the Junior League of Topeka supported the program through volunteer help and finances for supplies and transportation.

The program continued for four years with the supportive efforts of the Junior League and in 1970, it became a permanent reality when the school district budgeted funds to operate the program.

In 1971, application was made and funds received to conduct a Title III Environmental Education program. This program was science oriented and included units and field trips for the handicapped, level six classes and secondary science classes. The Outdoor Education program continued to function but was revised to fit the needs of level four students.

In 1974, the Title III Environmental Education program was phased out as a federally funded program and the two programs were combined under one department.

In 1975-76, the program was broadened to include first, second, and third level students, deeming it the full sequential program it is at present.

Sequential Format

The overall goal of the Outdoor-Environmental Education program is to afford each student the opportunity to formulate an aesthetic awareness of the world, a knowledgeable understanding of the world's components and their interactions, a sound basis for decision making, and a respect for all disciplines of knowledge as contributors to a balanced world.

To fulfill this goal, a sequential program has been formulated. For each level, specific objectives, closely correlated with the existing classroom curricula, are presented by:

1. Outdoor-Environmental Education written curricula furnished to classroom teachers by the Outdoor-Environmental Education program (for all elementary and middle school classes)
2. a classroom presentation made by an Outdoor-Environmental Education staff teacher
3. a field trip led by the Outdoor-Environmental Education staff
4. optional pre- and posttesting developed by the Outdoor-Environmental Education staff.

The sequence of experiences is as follows:

Grade Level	Trip	Length of Trip	O-EE Curriculum	Main Concepts Developed
1	Dornwood Park	1/2 Day	(Teacher) Let's Look at Plants	Ecological role of plants
2	Topeka Zoo	1/2 Day	(Teacher) Let's Look at Animals	Animal groups and adaptations
3	Central Topeka	1/2 Day	(Teacher) Let's Look at Topeka (Student) Tales Told by a Tree	City components and history
3	One-Room Schoolhouse	1/2 Day		Olden-golden school days
4	Camp Qu-Tu	Full Day	(Teacher and Student) Outdoor Adventure	General ecology and Kansas history
6	Camp Qu-Tu	Full Day	(Teacher and Student) Walk With the Wind	Ecosystem comparisons, orienteering
6	Camp Qu-Tu	Full Day & One Night		Overnight camping experience
7	Topeka	1/2 Day	Coordinated with Social Studies Curriculum	Land use, ethnic contributions, history

Sequential Format (cont.)

Grade Level	Trip	Length of Trip	O-EE Curriculum	Main Concepts Developed
7	Mission Creek	1/2 Day	(Teacher and Student) Ecology of a Stream	Water ecology
*7 or 8 (*8th Grade in 1984-85 only)	Flint Hills	1/2 day	(Teacher and Student) Geology of N.E. Kansas	General geology and ecology
Biology	Kansas River Woods	1/2 Day	Life In A Forest	Woodland and grassland ecology
Biology	Dyche Museum	1/2 Day	Coordinated with textbook	Biomes, adaptations, paleontology
Chemistry	DuPont	1/2 Day	The Chemistry of Cellophane	Application of chemistry
Physics	Holton Power Plant	1/2 Day	Coordinated with textbook	Practical application of physics
Special Education	Adaptations of levels 1-6	1/2 to Full Day	Specific units for each trip	Refer to above
Gifted	Adaptations of levels 1-6	1/2 Day		Refer to above

The program is in operation during the entire school year. Day trips and overnight trips in the natural environment take place in fall and spring. There are also snow trips and "cabin fever" trips in the winter. For these, classes are prepared well in advance to go on a trip to Camp Qu-Tu with 24-hour notice in case there is snow or a spring-like day in mid-winter. Winter is also the time for urban studies, museum, and industrial trips. A summer school experience has been offered to Chapter I students.

Philosophy of Program

Philosophical considerations are incorporated in the overall goals of USD #501. The Outdoor-Environmental Education program facilitates the fulfillment of these by offering to teachers and students curriculum materials and experiences which "turn kids on" to learning.

1. USD #501 Outdoor-Environmental Education is a learning process which is . . .
   a. continuous
   b. humanistic

Philosophy of Program (cont.)

   c. inquiry oriented

   d. interdisciplinary

2. It concerns itself with four equally important divisions of the world.

   a. Abiotic: sun, air, water, land, mineral resources

   b. Biotic: plants, animals

   c. Man: physical, emotional, intellectual, and spiritual aspects

   d. Culture: the products of man's intellect; e.g., government, laws, economics, industry, services, arts, education, recreation, utilities, communication, transportation.

3. It concerns itself with the interrelatedness of the above.

4. It seeks to produce growth in the student. This growth will . . .

   a. increase commitment to active participation in society.

   b. clarify values.

   c. increase knowledge.

   d. sharpen aesthetic appreciation.

   e. develop learning and problem-solving skills.

   f. encourage creativity.

Activities and Teaching Techniques

The USD #501 O-EE program is an activity-oriented program. The written curricula suggest numerous classroom activities, the O-EE staff classroom presentations involve student activities, and the field trips are built on activities. A brief overview of trip activities follows.

> Level One: Use of hand lens to study soil, leaves, flowers, seeds; use of all the senses to perceive the natural environment; use of flowers, leaves, sandstone, soil ("nature's crayons") to make pictures.
>
> Level Two: Hands-on experience with animal objects to group animals as invertebrates, vertebrates, (fish, amphibians, reptiles, birds, mammals); hands-on experience with skulls to group animals as herbivore, carnivore, omnivore; guided observations at zoo to relate adaptations to habitat.

Activities and Teaching Techniques (cont.)

Level Three: Use of imagination and observations to contrast old and new on city bus tour; use of slates, McGuffey readers, map, and spelling bees, in one-room schoolhouse to "live history."

Level Four: Fossil hunt; food chain hunt for producers, consumers, and decomposers on hikes at Lake Perry Environmental Education site, Camp Qu-Tu; participation on "challenge course" using teamwork and cooperation.

Level Six: Data taking to compare ecosystems at Camp Qu-Tu; use of compasses and topography maps to orienteer; choice of creative art using natural materials, archery, whittling, rope making. The overnight option includes camping skills, food preparation, night hikes, in addition to ecosystem study.

On all trips to the study site, observation and listening skills are utilized during bus presentations. For elementary students, the return trip includes group singing.

Middle School Stream Study: Water testing; use of seines, D-nets, etc.; plant and animal identification; data taking.

Middle School Geology Study: Finding and identifying rocks and minerals (glacial erratics) in stream bed; limited collecting of fossils, geodes, and minerals; using rock hammers; observation of Flint Hills.

Middle School Urban Study: Ethnic emphasis in observations, cemetery study.

Biology: Kansas River Woods--Keying trees, shrubs, grasses, forbs, from localized key developed by O-EE; limited tree boring; hiking; investigating sand bars.

Biology: Dyche Museum--Data taking, problem solving.

Chemistry: Problem solving

Physics: Problem solving

Numerous teaching and learning techniques have been developed and adapted to teaching the classroom presentations and in the field. Whenever possible, the learning is experiential rather than vicarious.

The discovery approach, hands-on experiences, and using the teachable moment when interest is high to teach objectives are utilized as the predominant methods of teaching. Open-ended questioning, moving from observations to problem solving and hypothesizing, is the method utilized. Acclimatizing and role playing are appropriate methods to increase the level of understanding of many of the objectives.

From student responses made during the O-EE teacher's pretrip presentation in the classroom, it can be determined at what level the O-EE staff should begin their teaching on the field trip. In addition, each O-EE staff member has developed a questioning strategy to determine where teaching on the field trip should begin. This is utilized as soon as students are assigned to them. By taking each student from where he/she is in comprehension to another level, (no matter to what degree the growth may be), each student experiences success.

Relationship to Other Disciplines

This program can be of value in the teaching of almost every discipline. Science is the primary discipline emphasized. Many topics and problem-solving skills emphasized in science are often taught more effectively in the field than in the classroom. The same condition holds true for social studies.

Experiences offered serve as motivation for language arts activities of creative writing, letter writing, and research projects. They can make real many selections in readers of the developmental reading series and serve as motivation for the remedial program. Language arts activities are incorporated with numerous guessing games, ordering, and organizing data.

USD #501 art, music, media, and physical education specialists have accompanied their students on trips so that they too can capitalize upon and apply the O-EE experiences to their fields. Fine arts are incorporated in each trip with studies of patterns, textures, color, sketching, tempo, and singing. Math is applied in numerous situations of measuring, testing soils and water, cooking, estimating, using a compass, using large numbers in communicating age of fossils, etc., and problem solving. Physical education skills are called upon in each of the outdoor trips.

Curriculum Development Process

1. O-EE staff review existing curriculum to determine area of emphasis and ensure the O-EE program's being an integral part of existing curriculum.

2. O-EE staff proposes what the O-EE program can do to fulfill existing goals that cannot be done in the classroom as effectively as in the field.

3. Stated goals and objectives are formulated by the O-EE staff.

4. Task force of classroom teachers works with O-EE staff to ensure product to be what is needed.

5. O-EE staff refines proposal, writes objectives, designs and implements pilot trip.

6. O-EE staff evaluates with classroom teachers; makes revisions, if necessary.

7. O-EE staff designs pretrip classroom presentation, pre- and posttests.

8. O-EE staff writes supplementary curriculum materials, if needed.

9. Evaluation

   a. Cognitive

      To demonstrate the accountability of the program in teaching cognitive objectives, a testing program is included in the total experience. Pre- and posttests for each level have been developed by the O-EE staff.

These instruments are revised periodically in order to keep them reliable as objectives and trips are revised. This testing was required of every class during the early years when the program was being established as viable in the cognitive domain. As it became established and recognized by the Board of Education as a viable program, a random sampling of classes from each area of USD #501 was tested each year. This practice continues. Many teachers of classes not in the sampling volunteer to participate in the testing as they have discovered that the testing is an effective teaching tool.

Primary level tests are read by the teacher. The student circles his/her answer on the test. These answers are then transferred to answer sheets by O-EE staff.

Answer sheets of all level tests are graded by USD #501 data processing. Results are utilized by classroom teachers and the O-EE staff.

Item analyses from the printouts are used by the O-EE staff to determine which objectives they are teaching effectively and which they are not. Methods to improve effectiveness in teaching are discussed at brainstorming sessions during staff inservice.

Posttest mean scores have been consistently through the years appreciably higher than pretest mean scores. Percentages of increase range from 25% to 56%.

Program evaluation forms are sent after each trip to each participating classroom teacher. From these evaluations, it can be determined if teacher and student needs are being met and if revisions are needed.

b. Affective

The affective domain is addressed at elementary levels through student-written letters to the O-EE staff. At secondary levels, the affective domain is assessed through classroom teacher comments on their evaluation forms.

Resources

The administration of USD #501 was instrumental in formulating this program in the beginning. This is one of the keys to its ultimate success. Administrative time has been consistently assigned to O-EE from the beginning. Currently, forty percent of a Curriculum Director's time is allocated to the program.

The Topeka community has been supportive from the beginning. The Topeka Junior League provided funding for transportation and volunteer support in the early years. Parents served as volunteers in the early days. They are still encouraged to accompany their student on any trip. Many do. The City of Topeka and Shawnee County have made available resource information and sites to be used for field trips (Zoo, Dornwood Park, Ward-Meade Park, Victor Schoolhouse).

Resources (cont.)

State and federal governments have been integral parts of the program. The State loaned 154 acres at Lake Perry (known as Camp Qu) to be used for students during the pilot project years. State and federal buildings are regular parts of urban studies. Federal funding was made available to USD #501 for development of this program from 1971-1974. Federal land (91 acres at Lake Perry) has been leased to USD #501 for environmental education. This area is now known as Camp Qu-Tu. In addition, some of the improvements at Camp Qu-Tu have been made possible through CETA.

The private sector has been invaluable in providing resources for environmental studies through the years: Kansas Power and Light, DuPont, Goodyear, Topeka Cemetery, Armco Steel (who also built a shelter house and tornado shelter at Camp Qu-Tu as part of their volunteer program), and hospitals. The much appreciated participation by these companies is indicative of the objective approach incorporated by the USD #501 Outdoor-Environmental Education Program.

Kansas University and Kansas State University, Spencer Museum, Kansas Museum of History, Dyche Natural History Museum, and the Menninger Foundation have all made their facilities and assistance available to Outdoor-Environmental Education to add to the depth of the program. The Kansas Geological Survey, Soil Conservation Service, Forest Service, and the Corps of Engineers have been used as resources innumerable times.

The incorporation of the myriad of ideas and facilities, represented by all of these contributors, has afforded the program a wide scope of disciplines and points of view.

Conclusion

The USD #501 Outdoor-Environmental Education program has been recognized as a Program of Excellence by the Kansas State Department of Education and has received the Excellence in Education Award from the National Association of State Advisory Council Chairmen. Teachers continually evaluate the program as valuable to their meeting their overall curriculum goals. But the most important criteria of success of the program are the students and the way they feel after experiencing the program about themselves, each other, and their world.

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Learning Activities Spring From Pennsylvania Farm

Tayamentasachta meant "never-ending waters" to the Delaware Indians. Today, it could mean "never-ending activities."

Tayamentasachta is a 60-acre farm near Greencastle, Pa., that was named for its bountiful spring. Since 1966, this farm has been owned and operated by the local school district as the Tayamentasachta Center for Environmental Studies.

The center provides a variety of activities for the community and enjoys widespread support. Activities range from environmental education courses to special community celebrations. Approximately 10,000 people participate in activities each year.

For teaching about the environment, the center has a woodlot, grasslands, areas for demonstrating strip farming and experimenting with plants, wildlife areas, a tree and shrub nursery, a walnut plantation, a colonial kitchen garden, and a weather station.

The spring itself provides a pond with 500 to 1,000 gallons of water per minute. The pond is used for aquatic studies and serves as a trout nursery. In a project sponsored by an association of local sportsmen, students each year raise about 4,000 trout for release in local streams. The pond also has nesting boxes for waterfowl.

Farm buildings include a mansion built in 1820 that contains a craft room, an ecology laboratory, a classroom, restored period rooms, and a natural and cultural history museum. A large brick and frame barn contains a workshop, toolshed, and storage area. The barn bays are used for large group activities.

The building complex also includes a Pennsylvania Dutch oven and smokehouse and a log cabin that was built by students to demonstrate early American domestic life. A windmill and a waterwheel were donated to the center to demonstrate alternative forms of energy.

About 4 miles of trails meander across the farm. One section of this trail system is a self-guided nature tour. Walkers, joggers, and high school cross-country runners regularly use the trails.

The center is used to teach students from kindergarten through the 12th grade about the environment. Educational activities are interdisciplinary and include instruction in science, math, English, social studies, home economics, art, vocational training, and other subjects. Regular classroom teachers are assisted in these activities by parent volunteers, high school students, and student aides. Government agencies such as the Soil Conservation Service provide additional assistance and expertise.

Many groups from the surrounding area —such as the Boy Scouts and Girl Scouts— use the center for various activities throughout the year. Nearby Shippensburg University uses the center to introduce graduate and undergraduate students to environmental education. Student teachers from the university are assigned to the center to gain experience teaching environmental education. The center also offers inservice training to teachers, administrators, and community leaders in environmental education, energy conservation, and the development of environmental curriculum and school sites.

Senior citizens from Chambersburg, Waynesboro, Greencastle, Fort Loudon, and Mennohaven use the center for programs such as the annual Apple Butter Day. On this day, fifth-grade students are teamed with senior citizens to learn how to plant apple trees and make apple butter, apple cider, and corn husk dolls. The children also learn to appreciate relationships with older people.

On one of their visits to the center, kindergarten and elementary students are given flower seeds to plant and grow in their classrooms. When the flowers are ready to be planted outside, they are returned to the center where the students plant them in flower gardens.

Other special events at the center include the Cumberland Life Festival, in which eighth-grade students demonstrate early American life styles for 2 days in May. To prepare for the festival, the students begin researching their projects in February.

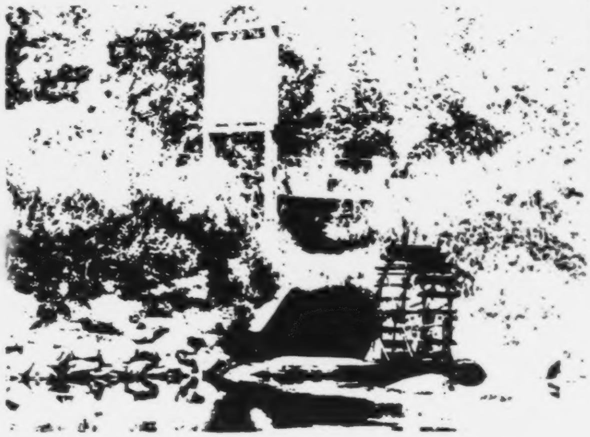
During December, the center hosts an early American Christmas that is open to the public. Senior citizens decorate the outside of the house for this event, and elementary and secondary art students decorate the interior. A high school choir sings carols.

Every 3 years, the community of Greencastle hosts Old Home Week. Present and former citizens get together during this week to remember past experiences and participate in dances, pageants, parades, concerts, competitions, and good fellowship. One day of the week is set aside for local craft persons to share their skills with the community.

The center is owned by the Greencastle-Antrim School District, and programs at the center are directed by a 15-member committee consisting of local community leaders, school administrators, school board members, teachers, students, and representatives from government agencies such as SCS. Committee members help host workshops and the special events.

Tayamentasachta is listed by the U.S. Department of the Interior on the National Register of Historic Places for its significance in American history, architecture, and cultural heritage.

Frederick E. Bubb,
public affairs specialist, SCS, Harrisburg, Pa.



The "never-ending spring" at Tayamentasachta Center for Environmental Studies near Greencastle, Pa., feeds a pond and trout raceways. Several alternative energy sources are displayed at the center, including a water wheel. The pond is stocked with fish and is heavily used by ducks and other wildlife.

INTRODUCTION

The Lathrop E. Smith Environmental Education Center is owned and operated by Montgomery County Public Schools, a suburban Maryland school system of about 100,000 students, located north of Washington, D. C. The center is situated in Rock Creek Regional Park, and although the school system owns only ten acres of land, the park encompasses over 2,000 acres.

The original facilities include a large dining hall with library and administrative area, and four dormitories. Additional buildings have been constructed by high school vocational education students.

The present program had its beginning in 1963 with one school and 77 sixth graders, but expanded rapidly and by 1974 when the Smith Center opened, over 9,000 students from 140 schools were involved in a 5-day, 4-night outdoor education experience. To accommodate these numbers, four outdoor education centers, in addition to the Smith Center are used year round. Most of the facilities used are rented from church groups or the YMCA. All are winterized.

The school system staffs each center with an outdoor education specialist, or on-site coordinator, who helps plan and carry out the program. Most of the instruction is done by the classroom teacher. To help prepare teachers for the outdoor education responsibility, the school system conducts in-service courses, and on-site workshops and provides guidebooks with appropriate outdoor activities.

GOALS OF THE PROGRAM

All sixth graders, most eighth graders, and many special education students participate in the program. The general goals are the same for all students, although each school is expected to develop more specific objectives to meet the particular needs of its youngsters. The first goal is to cultivate students' awareness, knowledge, appreciation and concern for the natural environment, and the

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Montgomery County (MD) Public Schools.**

effects of people's actions upon it. The intention is to help students understand some of the cycles and interrelationships that exist in nature and the consequences of disturbing them.

A second goal is to motivate students to develop positive attitudes toward learning through varied experiences in the natural environment. Outdoor education has proven to be an excellent means to maintain or restore some of the interest and excitement toward learning that is typical of children in kindergarten or first grade. The sensory-rich natural environment provides many opportunities to do this by involving all of the senses in learning.

The next goal is to provide children with many direct experiences in using scientific processes. While much subject matter may be covered, the goal is to get teachers to use the process approach to learning and emphasize such things as observing, meauring, classifying and hypothesizing. This seems more achievable when the emphasis is on learning by doing.

Another goal is to make the students' regular school program more meaningful by applying knowledge and skills acquired in the classroom to real-life situations beyond the classroom. For instance, since students are away from home they are expected to use language arts skills acquired in the classroom to write letters to parents or guardians back home. Previously learned mathematics skills may be used to measure the circumference of a tree, and then to figure its diameter or even the number of board feet of lumber it could provide.

The fifth goal is to help children to learn to live democratically and responsibility for the welfare of the total group. In a live-in situation, students take turns assuming responsibilities where other students' welfare is concerned. For instance, everyone has KP duty where he or she sets up the dining hall, serves the food, and cleans-up afterwards. Also, dormitories are inspected daily and a clean cabin requires the cooperation of everyone living there.

Relating to this is a goal to improve human relations among children and between adults and children. Like most of the previous goals this one is not the exclusive domain of the outdoor education program, but a situation where students and teachers are living together 24 hours a day presents opportunities that do not exist in the typical classroom. Students get to know each other better as well as their teachers and vice versa. Not only can human relations be improved, but teachers are put in a situation where they can learn much about their students and consequently, do more than pay lip-service to individualizing instruction.

The final goal is to improve students' physical fitness. Although students generally do not play ball games or indulge in the usual physical education activities while at the outdoor education center, there is much physical activity built into the program. Students are often asked to extend themselves a bit and frequently find out they can do more than they thought they could. They may complain about a strenuous hike, but they generally complain with pride.

FACILITY/SITE DESCRIPTION

Rock Creek Regional Park, in which the Smith Center is located, is a V-shaped stream valley park roughly in the middle of Montgomery County, MD, with Rock Creek forming one side of the V and the North Branch the other side. The rolling hills were forested when the first European settlers came, but most of the land was cleared and placed under cultivation. Today the steep hillsides are wooded and most of the fields in the park have been abandoned and are alowly returning to woodland. Some areas are mowed regularly and maintained as meadows. All of the land around the park has been subdivided and contain homes or soon will. The Smith Center is located in the North Branch wing of the park in a section encompassing about 450 acres designated a natural conservation area. In addition to the fields, forests, and the North Branch, there are smaller streams, a 54 acre lake, 2 ponds and a marsh.

The main building of the Smith Center includes a dining hall/auditorium, planetarium, kitchen, library, lavatories, storage areas, offices, and workshop. Each dormitory is divided in half with a classroom/meeting area and staff room in the middle. The dormitory rooms have private showers and stalls. The capacity of each dormitory room is 15 students and one staff member for a total of 120 students and 8 staff. Each staff room has a bath and will sleep 4 people.

The versatility of the Smith Center has been enhanced by additional structures built by high school students participating in the school system's Construction Trades Project. These structures include a pavillion, poultry house, barn, shed, tree house, solar building, covered bridge, storage shed for high adventure equipment, and another one for bicycles. A private firm has erected an electricity generating windmill on the site. A pioneer farmstead with authentic log buildings is a joint project of the Moantgomery County Department of Parks and the Smith Center.

The rented centers used by Montgomery County Public Schools include Mar-Lu-Ridge, located in the Catoctin Mountains and overlooking the Potomac River; Summit Lake near Camp David and also in the Catoctin Mountains; Glenkirk, on Lake Manassas near Manassas National Battlefield Park in Virginia; and Camp Letts on the Rhode River south of Annapolis and near the fossil-rich Calvert Cliffs of Chesapeake Bay.

ADMINISTRATIVE STRUCTURE

Montgomery County's outdoor education programs are administered by a supervisor of outdoor education programs who reports directly to the deputy superintendent of schools. The supervisor's job is somewhat like that of principal, with the student body changing every week. In addition, the supervisor has responsibility for programs at the rented outdoor education centers. At all centers he is assisted by an outdoor education specialist who functions as an on-site coordinator. Since not more than 4 centers are operating at any one time, there are 4 of these positions. The staff of the Smith Center also includes a day-use coordinator for the approximate 10,000 students a year who use the center on a daily basis and a librarian, who assists teachers with materials and programs.

The supporting services staff includes 4 building services workers, 1½ secretaries, 4 kitchen staff, and a health technician, provided by the County Health Department. There are also nurses employed at each rented center and a bus driver at one center where several field trips are incorporated into the program. Throughout the year, high schools and college students intern at the Smith Center.

All teachers involved in the program must participate in an on-site workshop at the center to which their school is scheduled. The school system's Department of Staff Development offers two 3 credit courses annually, "Teaching Techniques for Outdoor Education," and "Basic Subject Matter for Outdoor Education." There is also a one credit course which trains instructors to use the "increasingly popular confidence course. Afternoon workshops are offered at the Smith Center in colonial crafts. The outdoor education specialists and librarian conduct demonstration lessons when requested, as their schedules allow. An Outdoor Education Program Handbook, which details procedures for planning and executing the program, is printed biannually.

The outdoor education program is an approved part of the Program of Studies for the sixth grade. However, as other schools or grade levels identify parts of the curriculum which can be taught better outdoors, they are scheduled at a center as time and space permits. As the sixth grade enrollment has declined, eighth grades have been involved in a 3 day, 2 night program emphasizing earth science.

While the Smith Center is a school facility, it is located in a park which is governed by the Maryland National Capital Park and Planning Commission. Since most instructional activities are conducted in the park, a close working relationship is maintained with the park department. Specifically, monthly "Park Improvement Meetings" are held with the staff of the Meadowside Nature Center, which is adjacent to the Smith Center. The staffs work exceedingly well together and the two agencies are able to accomplish much more cooperatively than either could alone.

PROGRAM FUNDING

Students participating in residential outdoor education programs pay a fee depending on the length of the program. These fees cover rental charges, food service, student insurance and other incidentals. Since the school system owns the Smith Center, no rental is involved and consequently the fee would be lower, except expenses are prorated and students pay the same fee regardless of what center their school is assigned. Financial assistance is budgeted for students who cannot afford the fee.

Agreements between the school system and camp management allow schools to bring one staff member free for every six paying students. With special schools or classes the ratio is one to four.

In addition to fees to cover the costs for some students, the school system also pays utility costs while students are at rented centers, salaries for the outdoor education specialists and other personnel at the Smith Center, and substitute funds to enable one teacher to participate for every fifteen students. Teachers also receive a stipend for each night they spend at the center. Transportation costs are paid for by the state.

SUMMARY

Montgomery County Public Schools conducts extensive residential outdoor education programs for over 9,000 students annually. Approximately 800 of these students are classified as handicapped or possessing some sort of learning disability. About a third of the total number are scheduled at the school system's Lathrop E. Smith Environmental Education Center. The rest attend one of four rented centers located outside the county. Scheduling is based on individual school needs and preferences.

Academic studies are planned around areas of the curriculum that can be learned better outdoors than indoors, and different ecosystems, local history, and use of maps and compass are emphasized. The students' regular teachers accompany them to the outdoor education center and do most of the teaching. One outdoor education specialist at each center assists with planning and teaching at the center and in-service activities prior to the experience.

Courses and workshops are held each semester to familiarize teachers with the instructional possibilities and teaching strategies appropriate to the outdoors.

Students pay a fee to cover most costs of the program, but financial assistance is available for students who cannot afford the fee.

In addition to residential outdoor education programs, about 10,000 students a year participate in day-use activities which utilize the unique instructional features of the Smith Center.

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Arlington Public School's Phoebe Hall Knipling Outdoor Laboratory, in Fauquier County, is located just West of State Route 600 between Routes 29-211 and 55. The 200 acre tract lies in Lambert's Gap between Pine Mountain and Biscuit Mountain in the Pond Mountain area. Trapp's Run, which flows eastward through the gap, is dammed on the east side of Pine Mountain to form a two-acre Lake. Trapp's Run is a spring-fed stream which flows freely throughout the year. The stream bed through the gap is largely of rock base with picturesque faults, pools, and water falls. The elevation of the property varies from a little less than 500 feet to a little over 900 feet.

On the west side of the gap there is an open meadow which lies in a natural bowl surrounded and separated from adjoining properties by a ring of small mountains providing a natural laboratory for studying the open sky and cloud formations during the day and stars at night. An old three room building is located on the southeast edge of the meadow which is on the Western slope and base of Pine Mountain.

Several of the eighteen springs on the property are in the vicinity of the field laboratory. A natural amphitheater is nearby.

The wooded areas contain both hardwoods and conifers with an abundance of diversified wild flowers carpeting the floor. The area is also heavily populated by numerous species of both large and small game.

On both Pine Mountain and Biscuit Mountain rock outcrops are numerous providing interesting geological formations.

A four-room cottage and a 30' x 60' redwood siding multipurpose building are located near the lake. The cottage serves as an office for the Lab Coordinator and a dining facility for students participating in overnights as well as week-long experiences at the Lab. The 30' x 60' building is used as a dormitory and large lecture laboratory, it also contains a library for student references and research.

A deed of scenic easement is recorded to assure continued protection of the site as a natural area.

Reprinted by permission of Phoebe Hall Knipling, Mildred Witten, Douglas Hunsucker, and Don F. Brandewie, Arlington Public Schools, Arlington, VA.

ABSTRACT

Use of the Facility

Activities conducted at the Phoebe Hall Knipling Outdoor Laboratory are under the direction of the Science Department, Arlington Public Schools. The Laboratory is used as an extension of classes conducted by Arlington Public Schools. Student groups are scheduled for day or overnight visits for specific learning activities throughout the school year. Approximately 5000 students have use of the lab yearly.

Programs conducted are related to the K-12 Science Curriculum as well as other curriculum areas which are enriched by outdoor learning experiences. The Interrelationships of the environment observed and compared in this natural area help develop environmental awareness. The student is able to see himself as part of the total environment and develop a concept of man's role in maintaining a quality environment.

The curriculum at each grade level includes environmental learning experiences for students beginning with the school grounds, nearby county parks and the natural area at the laboratory.

An exciting, highly successful summer program called Outdoor Lab Science Enrichment is conducted at the Phoebe Hall Knipling Outdoor Laboratory. This program involves a week-long stay at the Outdoor Lab and is designed for students currently enrolled in grades 5, 6 and 7 in the Arlington Schools.

NATURE OF PROGRAM

Arlington's outdoor education program provides for day, overnight and week-long study experiences. The day programs offer opportunities to hundreds of children who could not otherwise leave their urban setting. We recognize that many learning experiences in the school curriculum can best be conducted in the out-of-doors. This great laboratory was here before schools and today our textbooks are written about it. Why not let the children experience it firsthand? This type of experience gives the teacher and children an opportunity to move out into the open and to learn from doing. Luther Burbank once said:

> "Every child should have mud pies, grasshoppers, water-bugs, tadpoles, frogs, turtles, elderberries, wild strawberries, acorns, chestnuts, trees to climb, brooks to wade in, water lilies, woodchucks, bats, bees, butterflies, pine cones, rocks, snakes, huckleberries and hornets; and any child who has been deprived of these has been deprived of the best part of his education."

All areas of the curriculum have a contribution and are included in our outdoor education program. The adopted D.C. Heath elementary science program has been correlated to our outdoor science activities. A library has been constructed at the lab and reading lists include a wide variety of books. Creative and expository writing are a part of the curriculum. Knowledge of camp cooking, animal life, and folklore add immeasurably to the program. Ability to read weather maps, identify stars and planets, perform folk dances for fun nights around the camp fire has a real meaning for students in their outdoor environment. Hiking the trails is a natural for physical education.

Outdoor education is simply one of a variety of approaches through which achievement of our educational goals may be facilitated. As a teacher-learning medium it cuts across subject matter areas and is interdisciplinary in nature. We believe that outdoor education provides a means for complementing and enriching instruction without which no system of education can truly be said to be complete.

Statistical information regarding the utilization of the outdoor laboratory for the past eight school years is provided for your information. Please note the significant increase in the statistical data between the 1977-78 and 1978-79 school year. The 1978-79 school year was the first year in which the School and County Boards provided the funding to hire a staff member to coordinate activities at the outdoor lab. It may be surprising to note the number of adults who also come to the lab. Many of these adults are parents of the children and serve as chaperones as well as provide expertise in many different academic fields. Their cooperation and generous assistance have contributed greatly to the overall success of the program.

STATISTICAL INFORMATION RELATIVE TO THE UTILIZATION OF THE OUTDOOR LAB

1. During 1977-78, 10 different schools scheduled the Outdoor Lab
During 1978-79, 25 different schools scheduled the Outdoor Lab
* During 1979-80, 28 different schools scheduled the Outdoor Lab
During 1980-81, 28 different schools scheduled the Outdoor Lab
During 1981-82, 28 different schools scheduled the Outdoor Lab
During 1982-83, 26 different schools scheduled the Outdoor Lab
During 1983-84, 26 different schools scheduled the Outdoor Lab
During 1984-85, 26 different schools scheduled the Outdoor Lab

2. During 1977-78, 882 students were brought to the Outdoor Lab
During 1978-79, 2724 students were brought to the Outdoor Lab
During 1979-80, 3378 students were brought to the Outdoor Lab
During 1980-81, 4739 students were brought to the Outdoor Lab
During 1981-82, 4858 students were brought to the Outdoor Lab
During 1982-83, 5149 students were brought to the Outdoor Lab
During 1983-84, 5000 students were brought to the Outdoor Lab
During 1984-85, 5091 students were brought to the Outdoor Lab

3. During 1977-78, the Outdoor Lab was used a total of 32 school days
During 1978-79, the Outdoor Lab was used a total of 88 school days
During 1979-80, the Outdoor Lab was used a total of 105 school days
During 1980-81, the Outdoor Lab was used a total of 138 school days
During 1981-82, the Outdoor Lab was used a total of 142 school days
During 1982-83, the Outdoor Lab was used a total of 146 school days
During 1983-84, the Outdoor Lab was used a total of 133 school days
During 1984-85, the Outdoor Lab was used a total of 149 school days

4. During 1977-78, (information not available) visited the Outdoor Lab
During 1978-79, 871 adults visited the Outdoor Lab
During 1979-80, 824 adults visited the Outdoor Lab
During 1980-81, 1041 adults visited the Outdoor Lab
During 1981-82, 1202 adults visited the Outdoor Lab
During 1982-83, 1153 adults visited the Outdoor Lab
During 1983-84, 1000 adults visited the Outdoor Lab
During 1984-85, 1110 adults visited the Outdoor Lab

* The Arlington Public School System now consists of 26 schools.
Eighteen elementary, 4 intermediate and 4 senior high schools.

The School and County Boards have provided a full-time staff member to work with teachers and students in utilizing the full learning potential of the Laboratory. Efforts of the Association, in cooperation with the Arlington Schools can now be directed toward improvements to the existing buildings and program expansion. The facility can provide comfortable quarters for staff development projects for teachers as well as a learning environment for students.

Outdoor education is no longer considered a novelty. Far and wide in many states, some experiences in outdoor education have been added to the curriculum. Many school systems own tracts of land that can be put to use as campsites and laboratories. Arlington is fortunate in that through a coordination of citizens of the community and the school system a 200 acre tract of land is available for all the students. This coordination demonstrates what can be accomplished when the community and the school system serving that community cooperate together to meet a perceived need.

The Arlington Outdoor Education Association has continued to work hard to support the goal of a "resident" program. Dormitories have been constructed. Dining facilities to accommodate 60 students have been completed. The only remaining obstacle is construction of shower and bath facilities. Preliminary cost estimates indicate a need for between 25 and 30 thousand dollars. Efforts are underway to raise these funds. Our "resident" program will be a reality within a few years.

Fund raising is almost completed to build an observatory in the meadow at the Outdoor Lab. This observatory, complete with sliding roof, will house a permanently mounted 10 inch telescope along with a number of portable 6 inch reflectors and 3 inch refracting telescopes. Construction of the observatory will begin approximately August, 1986.

Educators have no quarrel with the idea that much subject matter about the outdoors can best be learned indoors. They would simply state that learnings having to do with the outdoors are sometimes incomplete. A typical life science unit on amphibians suggests an excellent example of the relationship of indoor and outdoor teaching. Students can read about and discuss both structure and function of a bullfrog. This may be done best indoors. In a good laboratory, the students can actually manipulate and even dissect the frog. But a frog doesn't function as a frog in the book.

The teacher who wants students really to know about frogs will take his students to a frog pond where structure and function are truly interrelated. The bulging eyes, long tongue and strong leg muscles make sense when the frog uses them in his own environment. Outdoor education adds a new and important dimension in learning by giving students an opportunity to translate textbook learning into real life situations. Odors of skunk cabbage, spice bush, paw paw etc., are not present in most suburban school settings.

It has been our experience for the past three years that the outdoor laboratory provides countless opportunities for learning experiences designed to support a strong appreciation for good human relations. Good human relations involve the development of understandings of one's self and consideration of other human beings. Ample opportunities to develop good manners and other considerate behavior are most evident as the students work, study, sleep and eat together on overnight or week-long experiences at the outdoor laboratory.

Outdoor education is the means by which each teacher, at every grade level, uses nature and outdoor experiences to make any subject matter being taught more meaningful. It is a method -- an environment -- and it applies to all areas of learning.

Outdoor education is not an added subject in itself; it is simply a learning climate. It offers opportunities for direct experiences in identifying and resolving real-life problems, for acquiring skills with which to enjoy creative living, and for attaining insights into the true meaning and value of human and natural resources. Outdoor education may encompass any of the subject matter fields in which a direct experience can reinforce and enrich learning.

The Arlington Outdoor Education Program is a "sense-able" program. "Sense-able" in that the student learns to use his senses to the fullest potential. George Perkins Marsh in his book Man and Nature said, "The power most important to cultivate, and, at the same time, hardest to acquire, is that of seeing what is before him."

The student not only learns to SEE what he looks at, but he learns to HEAR the sounds that he listens to, to FEEL the things he touches, to TASTE the things he eats, and to SMELL the odors he sniffs. Once a student has acquired these habits, every walk to school, bus ride, or trip across country has a purpose other than just to get to a destination point. A person who acquires these traits early will habitually analyze situations before making judgments and will not have to search elsewhere from his present surroundings to find exiting and satisfying interests to occupy leisure hours.

It is:

not a new program -
only an extension of various disciplines using the outdoors as a laboratory.

not a "way out" idea -
but truly a "Man on Earth" program using the land as a laboratory and the performances it makes possible as resources.

not an expensive program -
because supplies are the natural resources.

not a program for just "the better students" -
but a program for "making better students."

not a program of specialization -
instead a way of making students aware of the interdisciplinary nature of all knowledge. There is only one natural environment of which each of us is a part. Each is a product of that environment and the actions of each help to shape that environment.

not a program to produce scientists -
but a program to produce citizens of good will by keeping alive in the minds of students the natural curiosity about the world around him. The development of understandings of and reverence for all forms of life carries over to respect for all kinds of people and understandings and solutions for various situations.

not a program for just learning a lot of names -
but a program for finding out what is going on. To memorize 50 names of plants, animals, or minerals would be difficult, boring, and meaningless. On the other hand, however, after learning some interesting things about each one and how their activities affect us, the names are remembered with ease. Students learn that some things which may at first appear useless and unattractive may serve a very useful purpose in the balance of nature -- There is a carry-over to the respect for people of different cultures and various occupations.

HISTORY OF THE PROGRAM

The Arlington Outdoor Education Association, Inc., a private, non-profit organization, was chartered in 1967 to promote the outdoor education program and to provide a suitable facility where urban children can have an opportunity to learn from firsthand experiences in a natural setting.

The purpose of the Association is best stated by quoting former Virginia State Governor Mills Godwin, from an address he delivered in 1967:

> "The best we can do . . . is to salvage representative natural areas and make of them learning areas that no encyclopedia . . . could come close to duplicating".

We want to provide you with a brief 14 year history of the Arlington Outdoor Education Association. Our primary purpose for this historical development is to share with you the years of time and effort put forth by the Arlington community which vividly demonstrates what can be accomplished through the joint efforts of the total community.

The events leading to the establishment of the Phoebe Hall Knipling Outdoor Laboratory began in the late fifties with the initiation of a summer enrichment program in outdoor exploration for students in Arlington Schools. For several years, both private and public lands were used for one-day and overnight excursions away from the increasingly congested metropolitan area. Each year it became more apparent that a permanent site for the summer enrichment experiences was not only desirable but necessary for reasons of safety and security.

An extensive search was made for an unspoiled natural area within easy commuting distance of Arlington. In January of 1967, a highly desirable location was found in Fauquier County, but means for purchasing the property were completely lacking. During the next several months many written and personal contacts were made with individuals as well as with private and government organizations and foundations to determine the availability of grants. These attempts utlimately led to an early May meeting in Connecticut of Dr. Phoebe Knipling of Arlington Schools with John Forbes and Dr. Bettison Shapiro of the Natural Science for Youth Foundation. They enthusiastically encouraged continued efforts to obtain the property, but advocated strong community involvement in such undertakings. Following this suggestion, community representatives composed of seventeen citizens and five school staff members met on June 7, 1967 and became known as the Arlington Committee for Outdoor Education.

During this period of deliberations, additional properties were visited to assure the Board that the best site had been chosen. In January of 1968, the Treasury stood at $355 with an outstanding bill of $100 and a membership of sixty-three loyal supporters. After further deliberations, conferences, negotiations and a loan from the Natural Area Council an agreement was reached with owner, Mary Rose Striker, for the Association to purchase from her a two hundred acre property in Fauquier County. The contract was signed on March 14, 1968.

In the days and months which followed, the critical deadline of the annual mortgage payments became a prime motivator. By May of 1969 the Treasury had grown to $5050 and the membership roster had increased to 513. Officers and Board membe changed as the membership roster increased.

Stephen Detwiler served as President during 1970-72. On Thursday, January 28, 1971 the first formal agreement between the Association and the Arlington County School Board was signed. The school system leased the property for the sum of one dollar a year as a permanent outdoor educational laboratory. The lease was signed on behalf of the School Board by Dr. E.E. Saulmon, Chairman, and signing for the Association, President Stephen Detwiler, stressed the "critical need for broad community support to insure the success of the laboratory program."

This period was a discouraging one for the Board because the funding which had seemed to be readily available through grants was not available to purchase land. A loan was negotiated which allowed the Association to get on its financial feet. The granter of this loan was reluctant to have his name revealed and for several years he was referred to as the "AOEA Angel." To meet the payments on the loan a project known as the Acre Saver program was initiated. Business organizations, service clubs, PTAs, and individuals were encouraged to contribute a sum sufficient to preserve an acre. Dr. Arthur True served as chairman of this project for several years.

Louis Baker took over as President during the last several months of Stephen Detwiler's term when the President moved from the area.

Dorothy Grotos became the third elected president of the Association in January 1973.

At the same time, during the late sixties and early seventies, citizen groups were invited to hold meetings at the outdoor facility. The Inter-Service Club Council and a number of member service clubs accepted the invitation and became a valuable source of financial and moral support for the laboratory. School groups of young people and parent-teacher associations became regular contributors.

In many instances, gifts were made available with specific purposes designated, as examples, a group of Kenmore students raised money designating it for construction of a fence, the Home Economics Club of Jefferson made a contribution designated to purchase an item for the kitchen.

Significant in the history of the organization was the retirement of Dr. Knipling as Supervisor of Science Education, Arlington Schools, in 1975. As a tribute to her years of dedicated service, The Board of Directors of the Arlington Outdoor Education Association voted to name the laboratory in her honor. It then became the Phoebe Hall Knipling Outdoor Laboratory. Friends and supporters of her untiring efforts to provide the laboratory contributed generously to the Association in her honor on the occasion of her retirement. Dr. E.E. Saulmon became President of the Association in 1975.

During 1977 and 1978 the Potomac Applachian Trail Club adopted the laboratory as a project and constructed trails which continue to be maintained voluntarily by that group.

As a part of its continuing effort to acquaint the public with the project, AOEA has participated in each of the Arlington County Fairs.

Fund raising was sufficiently successful to repay the $51,100 "laboratory-saving" loan to the Association's Angel (Mr. Preston Carruthers) December 13, 1976. The final mortgage payment to Mrs. Striker in November 1978 represents achievement of a seemingly impossible task. In the beginning, meeting a $90,000 mortgage within ten years, under the direction of a volunteer Board of Directors, to secure funds through voluntary contributions of time, talent and money seemed impossible. Such a project demanded a driving force of unlimited energy and enthusiasm. The Phoebe Hall Knipling Outdoor Laboratory stands as a tribute to that "driving force."

This project by mobilizing the efforts, talents and generosity of friends co-workers and families has achieved the goal of providing a permanent site in a natural environment for future generations of Arlington students.

Funds for expenses of operation of the Outdoor Laboratory are being met through memberships, contributions and other fund raising activities. Fund raising events are a community wide endeavor. Approximately $10,000 are raised annually by the Arlington Outdoor Education Association to help offset the yearly cost of operation. In addition, the Arlington School Board provides a yearly sum of $60,000 to staff, transport students and maintain science equipment and supplies.

EVALUATION

Evaluation of the program occurs in many ways. In some instances we receive letters from parents commenting on the value of the program for their children. Many newspaper articles (Washington Post, Washington Star) have been written concerning this program. These articles quote students, teachers and parents as they describe their experiences at the Outdoor Lab.

Written evaluations are required of all student participants in the week-long summer programs conducted at the Outdoor Lab. During the school year teachers require both written and oral evaluations of their students as they participate in day and/or overnight experiences at the Lab. Samples of the various types of evaluations are attached for your information.

gfps
Great Falls Public Schools
Great Falls, Montana

ENVIRONMENTAL EDUCATION

K - 12

Reprinted by permission of Janet Thomson, Dennis Maxson, and John Cannon, Great Falls Public Schools, Great Falls, MT.

Great Falls Public Schools

Great Falls, Montana

Environmental Education Status Report

Spring, 1986

The Great Falls Environmental Education Program was implemented with ESEA Title III funding in 1967, as a direct result of a Title III planning project in 1966. Services are extended K-12 as needed.

The original major objectives of the program were:

1. Utilize the outdoors as a classroom to teach broad ecological concepts through first hand experiences.
2. Curriculum planning in the form of curriculum outlines and prepared units of study correlated to outdoor studies.
3. Inservice training for teachers.
4. Provision for necessary equipment and supplies to function as an integral part of classroom curriculum.
5. Professional leadership and teacher assistance in all activities by two program teachers. Coordination of the total Environmental Education program with all departments of schools.

These major objectives have been retained and are supplemented by revised (every year) unit goals and objectives. All materials for the experiences are built around these goals.

Sites throughout the Great Falls region are utilized for trips rather than one designated area. For example, sixth graders in the forest-prairie experience travel over seventy miles to several work sites, including a deciduous plant area near Belt, a mine-polluted stream near Belt, a quality fish-producing stream (Belt Creek), a small watershed (Memorial Falls), a small valley used for orienteering (Dry Fork of Belt Creek), and a transition-forest area. Holter Lake lands southwest of Great Falls near Cascade and Hardy Creek are sites for the fifth grade Soils unit. Third and seventh grade trips utilize the Benton Lake Water Fowl Production area, ten miles north of Great Falls. High school experiences on occasion include the Yellowstone ecosystem (three-day experience), the Choteau area, Little Belt Mountains, the Highwoods, and the Helena area. Sites are chosen for specific utility.

Currently, the program activities begin at the first grade with an Animal Difference presentation. This program for first graders lasts about an hour. The two teachers utilize a trunk-full of animal hides and hooves, etc. so that first graders can be exposed to animal differences. During the 1985-86 school year, 942 first graders and 46 teachers participated in the animal differences unit.

Second graders participate in a one-hour "show and tell" talk on fossils, which correlates with their science. All students are allowed to handle the fossils. During the 1985-86 school year, 975 second graders and 44 teachers participated in the fossils and dinosaurs unit.

Grade three students participate in several units. In November, all third graders learn about recycling in a unit before they go on a two-and-one-half hour recycling trip to various businesses in the city. They learn the major concepts concerned with recycling, (one of the major concepts for today's Environmental Education Program). Later in the year, third graders receive a one-hour microscope lesson in the classroom so that they will be able to utilize microscopes. Early in the spring of the third grade year, all third graders spend two hours at Benton Lake (protected fowl area ten miles from Great Falls); there they collect materials suitable for viewing with a microscope, learn to identify five different kinds of wild birds, and collect water for a microscope lesson. During the 1985-86 school year, 931 third graders and 37 teachers participated in the recycling, microscope and Benton Lake and pond study units.

Grade four students spend several weeks on a water-waste water unit in the classroom before the culminating trip to a water treatment plant. They also have a one-hour lesson on rock identification and begin to use a very simple identification key. This identification key provides them with the initial experience necessary for future trips where keys will be extensively used. During the 1985-86 school year, 915 fourth graders and 39 teachers participated in the rock identification and water-waste water units.

In grade five, students participate in a one-hour classroom experience concerned (during the Christmas season) with identification of evergreens. They work with live specimens of evergreens and learn to use an evergreen identification key. The key is taken home and many families end up using this evergreen key as they get out into the woods. This is their second opportunity to use an identification key. Later, in fifth grade, students spend time on a water quality unit and field experience along the Missouri, learning what kind of water it takes to raise trout and other kinds of fish. Still later in the spring, fifth graders are involved in an all-day Soils trip. They do chemical tests on various kinds of soils to find out what kind of weather it takes and what kind of soil it takes to grow crops; they also are given the chance to work with contour maps and compasses. They also learn about the geology of the Hardy Creek area (volcanic). During the 1985-86 school year, 847 fifth graders and 34 teachers participated in the evergreens, water quality and soils units. The fifth grade experiences are a bridge to sixth grade activities.

Sixth graders begin the year with two-day experiences on the prairie and in the Little Belt Mountains (day trips). All students learn to work with a deciduous tree key as well as the evergreen key they have already used in the fifth grade. They do chemical tests on "live" water and "dead" water (they ascertain why creeks "die" and what things are necessary for a stream to be "alive"). They examine the life forms in creeks to tell whether or not a creek would be good for fishing. They spend time orienteering, with the knowledge they have gained about contour maps and compasses. They utilize dendrochronology to date trees and utilize some of the knowledge which they have learned about evergreens as they identify succession. They hike nearly the length of a small water shed to realize the concept of "water shed". In the spring of the sixth grade year, students are involved with an energy trip in which they learn about various forms of energy and the wise use of current resources. During the 1985-86 school year, 797 sixth graders and 33 teachers participated in the forest and water pollution and energy conservation units.

Seventh graders study ornithology before spending a half-day at Benton Lake. Environmental Education teachers are available as resources to high school teachers for a variety of activities as ninth grade earth science, Montana geology and ecology students study environmental issues (in and out of the classroom).

The program is staffed by two well-versed Environmental Education teachers. These teachers have continued to build the program and recycle activities where needed. They are continually changing the program as part of an ongoing evaluation. They also provide assistance to teachers in classrooms on demand; for instance, they do fish dissection lessons and other demonstration lessons in the classroom as time permits. The Environmental Education program received a commendation from the Office of Public Instruction Investigation Team in December, 1983. Thousands of students are involved in Environmental Education at the elementary level; only kindergarten is not included in the classes at this time. The District has supported the Environmental Education Program since the 1970-71 school year.

DISTRICT SCIENCE CENTER

The Environmental Education teachers are also responsible for the District Elementary Science Center, housed at Paris Gibson School (Environmental Education is based there). In 1981 all Cenco Science Kits were torn apart by Environmental Education teachers, who took the summer to restock items needed for the new program. They were able to ensure that teachers would receive quality material in addition to setting up a restocking system (includes items going into each kit every year and items going into the main science supply at each building each year). They take care of the ordering for these materials and are responsible for the distribution of these materials each year. This activity, in its fifth year, is going very smoothly.

A telephone answering device was installed so that teachers can phone into the Environmental Education-Science Center phone and leave messages for the Environmental Education teachers. These messages might include requests for extra materials, requests for extra classes, requests for advice for experiments, etc. The Environmental Education teachers are available to help teachers as needed. The program is successful with teachers. Much of the reason for the success of this program can be attributed to having the time and personnel to plan, organize and coordinate activities, making it an integral part of the curriculum with classroom teacher participation. Project personnel, with the assistance of resource personnel, make the initial tentative plans for an activity. Working with the teachers, the activity is modified wherever necessary.

For further information about the Great Falls program, contact Janet Thomson, Curriculum Coordinator, (406) 791-2377), Great Falls Public Schools, Box 2428, Great Falls, Montana, 59403. Tours and materials are available upon request.

An Outstanding Outdoor Laboratory

Students at Prairie Heights School Built This Shelter for Their Outdoor Laboratory.

By Larry L. Lichtsinn
District Forester

Prairie Heights School Corporation in northeastern Indiana's LaGrange County operates what has been adjudged to be this State's most outstanding outdoor laboratory. Moreover, Ned Stump, vocational agriculture instructor at Prairie Heights, has been selected as the individual within the school unit who was the most instrumental in initiating and implementing the concepts of multiple-use natural resource management in the school's outdoor laboratory.

The citations were made by the Indiana State Tree Farm Committee after a statewide survey of natural resources education. The Committee is sponsored nationally by the American Forest Institute and in this State by the Indiana Hardwood Lumberman's Association.

The Prairie Heights School Land Laboratory consists of 230 acres of land in LaGrange and Steuben Counties. This tract contains the school buildings and grounds, the school farm, and the Nature Study Area. The Nature Study Area, along with the nature trail, was established in 1963, the first year of operation of the school. Intensive use of the nature trail began in 1965.

An average of 1,000-1,500 students and teachers use the Area each year. Many visitors who have toured and used the area are from outside the school system. Even though Ned Stump was instrumental in establishing the Nature Study Area, he is quick to point out that the School Farm and Nature Area have received a lot of support from the school corporation and the entire community. [See *Outdoor Indiana* June 1971, February 1977.]

The Prairie Heights Community School Farm and Nature Area consists of areas to demonstrate crop rotations, irrigation, livestock management, strip cropping and other agricultural conservation practices and techniques. Also, there are 95 acres of native hardwood forestland, Christmas tree plantations, windbreaks, ponds, wildlife areas and even a wildlife "containment area" with Buffalo, Deer and Wild Burros.

A U.S. Weather Bureau Observa-

From *Outdoor Indiana*, vol. 43, no. 6, July/August 1980, pp. 25-27. Reprinted by permission.

A Swinging Bridge Over a Marsh at Prairie Heights Nature Study Area.

tion Station is also maintained at the school. A self-guided nature trail winds throughout the meadow, "old fields" and woodland portions of the Farm. Visitors can view ponds, strip cropping, marshland, fungi, various species of trees, shrubs, herbs and wildflowers, glacial boulders, wildlife food plots and dens, and many other interesting sites.

Specific instruction is given during the school year in the Nature Study Area on such subjects as wildlife, resource conservation, forestry and soil and water conservation. The forestry education includes tree identification and species study, tree growth, tree selection, tree planting, tree measurement, tree selling along with special projects such as collecting sap and making maple syrup, and growing and selling Christmas trees.

To complement the nature studies of the Outdoor Laboratory, a timber harvest was made in the Winter of 1978-79. More than 80,000 board feet of timber were selectively harvested from the area.

Part of the income from the timber

This Skid Trail Used for Winter Logging Resulted in Minimum Disturbance of Soil and Vegetation at Prairie Heights School.

sale will be used to off-set part of the construction costs of erecting a Nature Center.

Members of The Prairie Heights chapter of the Future Farmers of America are cutting and selling firewood from the tops of the trees which were harvested. This group has the major responsibility for managing the school farm and its activities under the guidance of the vocational agriculture department and a school committee.

The Land Laboratory gives the school corporation, the community and other users not only an opportunity to utilize these acres in practical instruction in actual surroundings for the natural sciences, but also the opportunity to enjoy these acres for recreation.

Resident Centers

The Resource Center for Environmental Education
Coconino NRCD

2733 East Lakin Drive, Suite 7 / Flagstaff, Arizona 86001
(602) 527-7308

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The Resource Center for Environmental Education: Adding Life to the Basics

Picture yourself as a 10-year-old child on a playground. You climb onto the high side of a teeter-totter, hit the ground, run to the other side, climb on and hit the ground again. Ridiculous? Of course. Yet too often we ask our students to do the same thing -- mentally teeter-totter alone. For example, a fourth-grade student can be told by his teacher for 180 days in a school year that hunting is bad. As a fifth grader, the same student in the same school hears hunting is great. An 11-year-old cannot sift through such teacher-imposed biases and develop a personal code of resource management ethics. Yet, dichotomous learning is commonplace in our schools and is confusing our young people. Environmental education, is a solution to this problem.

In Flagstaff, Arizona, the Resource Center for Environmental Education has accepted the responsibility to see that factual, unbiased, locally relevant information about our natural resources gets into the classrooms. The Center objectively balances both sides of a question, such as the hunting issue, basing information on ecological facts and input from interest groups representing all sides of the question. This lays a foundation of factual information upon which students can base later decisions.

In the early 1970's, a young biology teacher's enthusiasm and vision set in motion a series of events that would have a nationwide ripple effect. Dr. Jim David initiated a student project at Flagstaff Junior High School that turned a 3-acre mudflat dump and adjacent acreage into an outdoor classroom with a pond. Publicity resulting from David's national NACD-Allis Chalmers Conservation Teacher of the Year Award, given to him for the outdoor classroom project, caused him to be inundated with requests for information about environmental education and outdoor classrooms. Because he was a full-time teacher, he didn't have sufficient time to respond to these requests. He proposed that the Coconino Natural Resource Conservation District (NRCD), which he chaired at the time, act as the parent organization for an educational program. The NRCD, which is a legal subdivision of the state government and is charged with the protection of Arizona's resources, recognized the need for students and citizens to understand their relationship with the environment. The NRCD realized that environmental education is the most effective way to meet this need.

Environmental education is defined as educational programs and activities that create greater understanding of both environmental problem-solving and decision-making. It involves teaching the ecological principles and relations through which solutions to environmental problems may be found(1). Other definitions could be cited but they all have two elements in common: the interrelationship between people and their environment, and the impact of people on their environment. The goal of the Resource Center is to develop in our youth an ethic of environmental stewardship that will carry through to their voting years. Our programs upgrade and maintain the K-12 science curriculum using a multidisciplinary approach to integrate environmental education, science, and "the basics".

Our goal is accomplished in six ways:

1) We present 18 one-hour in-class programs about natural resources and the interdependence between people and nature. The lessons include lectures, slide presentations, and specimens for the students to touch and examine closely. We provide multidisciplinary follow-up activities for the teachers to use with their students.

2) We offer teacher in-service training workshops of 12-16 hours for school district or university credit. Some workshops familiarize teachers with environmental curricula (Project WILD(2), Project Learning Tree(3)). Others introduce teachers to outdoor study areas or provide a mixture of student activities and background information on a particular aspect of the

environment. Local experts assist with the workshops by giving presentations.

3) We develop curriculum. Committees made up of Resource Center staff, teachers, and resource experts develop materials that are locally relevant, timely, and multidisciplinary. Teachers receive commensurate school district credit for their work.

4) We conduct field trips to national monuments and biologically unique areas. School vehicles are used to transport teachers and students.

5) We coordinate and assist with the development of outdoor classrooms. These range in size from a 400 square foot on-campus area to the 400 acre Mt. Elden Environmental Study Area.

6) We provide a resource reference library of environmental materials, methods, and information. Teachers are encouraged to checkout books, curriculum materials, and program aids.

Our target population includes school students grades K-12, university classes, scout groups, church groups, pre-school classes, other youth groups, and adult organizations. Our main focus, however, is the public school. We serve students who have access to the out-of-doors, although our audience includes urban, suburban, and rural schools. The sizes of the five school districts we serve range from the 10,000-student Flagstaff School District down to the one-classroom Chevelon Butte School District. Programs are designed to be appropriate for all student populations including emotionally and mentally handicapped, learning disabled, gifted, and students from both the Navajo and Hopi Indian Reservations.

The in-class portion of our program is the most important aspect. Topics are chosen and developed by the staff, although some of our programs are outgrowths of special requests from teachers. We utilize slides and other audio-visuals in our programs. Many of the slides are duplicates of slides used by resource people in our community, such as a Forest Service hydrologist, who are very willing to share materials. We use display items such as study skins, soil samples, and tree cross-sections for the students to touch and individually investigate. Posters, publications, materials, and time are donated by the USDA Forest Service, USDA Soil Conservation Service, U.S. Geological Survey, Arizona Game & Fish Department, State Land Department, City of Flagstaff, local museums, and observatories. Many local agencies, businesses, and groups have materials that are free or available for loan. Our programs require no teacher training workshops nor preparation by the teachers. We provide follow-up materials for student enrichment to interested teachers. Our programs address both cognitive and affective skills and processes. A major goal of teaching process skills is to develop within each individual the ability to obtain, organize, translate, interpret, and apply bodies of knowledge. Environmental education accomplishes this goal by addressing these skills and encouraging students to use them in real-life situations.

We have received many requests for information about the development of outdoor classrooms. Good publications are available through the Soil Conservation Service, but there is no substitute for talking with someone who has developed an outdoor study area. Sizes and logistics vary from site to site. In 1982, the Resource Center surveyed teachers and found that a 400 acre study area would be better utilized if a trail system and a curriculum guide were available. The Resource Center responded to that need by developing four trails with number-keyed trail guides. These guides give general information, related activities, and resources. We published a kindergarten through sixth grade curriculum guide designed for use in the area. The entire community -- schools; parent/teacher groups; federal, state, and local agencies; businesses, service organizations, scout groups, and individuals -- have worked together to make the area a place the people of northern Arizona can use to learn more about the environment.

Teacher evaluations of in-service workshops show 90% feel these workshops are the best they've ever attended. They can't wait to share their new knowledge with their students. Many experience new teaching strategies such as the inquiry method. Teachers evaluate the in-class programs as excellent--very well correlated with curriculum, well geared to student audience, utilizes different learning modalities, and informative. Teachers find our presentations motivate both the students and themselves. They ask us back several times a year and new teachers are scheduling programs. Each year our number of student contacts increases. In the 1984-85 school year we spoke to over 14,000 young people. Many teachers have noticed that today's students have a better understanding of the environment than did students in the past at that same grade level.

For students, increased cognitive knowledge, better relationships between teachers and students, decreased vandalism, increased community involvement, and other positive spinoffs (e.g., better grades due to more positive attitudes) show the effects of the program are educationally meaningful. Letters from students show that they enjoy learning math, science, social studies, and language arts while learning about owls or comets or soils. Special students often excel in environmental education thereby reaffirming their sense of self-worth.

The Center has a 501(c)(3) tax-exempt status, which enables it to accept donations and to apply for grants. According to an intergovernmental agreement, each of the five school districts pays $.50/student based on 1985 enrollment figures. We receive a fixed amount of the Forest Reserve Fees or "in lieu of tax" monies paid to the county. In the 1985-86 school year, we are operating on about a $33,000 budget. In addition, we receive $7,000 in the form of in-kind support from various agencies.

This budget is tight but workable.

We currently have a staff of two full-time people, a part-time secretary, and a volunteer instructor. A teaching certificate is not a prerequisite for a staff position, but it is important to be able to relate well to young people, to have a good background in science or natural resources, and to be familiar with different teaching methods.

How can you set up a Resource Center in your area? You need a committed and enthusiastic individual to do the busywork involved with the implementation of such a program and to keep the momentum going. Teachers in your school should demonstrate interest and administrative support is essential. Funds must be available for operational costs. Community and student involvement make the program work. You can't expect overnight success, but within the first year you'll see some positive results. Keep your focus small in the initial stages. This will provide the opportunity for rewarding successes. We are in our eighth year and the program continues to expand and be refined.

From an administrator's point of view, the program's most important asset is that it is cost effective. The expense of the program is shared by five school districts, thereby minimizing the direct expenditures by any one district. None of the usual hidden costs associated with hiring an environmental education teacher are incurred. Yet each district benefits from the services that are made available.

From a curriculum standpoint, the program offers several advantages. All disciplines are strengthened because Resource Center staff fill the gaps in teacher knowledge. Teachers are involved in development of programs and curriculum, providing a sense of ownership. Curriculum development is shared by many, thereby taking less time on the part of the curriculum superintendent. Limits on time and money, and requirements to give all programs equal attention could result in a less thorough job if the school district were forced to develop its own prsentations, curricula, and to coordinate the various agencies. Only when an outside agency works closely with school district personnel, however, are materials developed that can be fully utilized. Special interest groups invest much time and money to develop materials that cannot be used in the classroom for one reason or another. In developing materials the Resource Center carefully ties activities in with texts in use and mandated skills.

Teachers, too, value the program. Environmental education is a technique, not a class. Using this technique, basic skills and areas of study are extended and supplemented. In half-day sessions in an outdoor study area, the lessons of previous weeks can be enhanced by a graphic representation of classroom principles. "I hear, I forget; I see, I remember; I do, and I learn." Students enjoy this type of learning! They respond!

What makes this program unique? First, one of the more unusual aspects of our program is our third-party format. The Coconino Natural Resource Conservation District is our parent organization. As an independent entity we are able to work directly with administrators. Things get done faster because of the direct communication. Second, unlike other environmental programs, we have never relied on federal or state monies. Programs that did are no longer in operation. The lack of soft funding, such as government grants, has forced us to turn to our community, thereby adding to its sense of ownership. Third, our programs take place in the schools or in an outdoor study area. We go to the teachers at their request. No fees are involved other than the funding as stated above.

Visits to other districts are limited because of time and money considerations. However, we are eager to visit their schools and speak with teachers and administrators if that district can pay for our expenses. We encourage teachers, curriculum supervisors, and administrators from other school districts to visit our Center if they are interested in developing a center of their own. In this way they get a graphic idea of the total concept. We discuss the differences in situations that might limit or change the scope of a program in their area. Programs should be sensitive to the needs of the community. Presently we serve five school districts, but plans are underway to establish at least four similar programs around the state of Arizona. These programs would use the Resource

Center as a model. After the first two years they would be independent but part of a statewide network that will assure continuity in environmental education programs.

A nation such as ours that relies heavily on finite resources also depends on an informed public that can adequately and comprehensively take part in policy decisions and actions at the local, state, and federal levels. This means that environmental education must be communicated both formally and informally to citizens of all ages. As environmental issues emerge in our society, the need for serious attention to the environment by our educational system increases. In a democratic society, the responsibility of making decisions concerning these problems and issues belongs to the citizens. The Resource Center for Environmental Education feels that by understanding ecological principles and translating that knowledge into action, we, the decision-makers, will make effective choices.

The Center owes much of its success to its founder, Dr. Jim David, and to Mr. Jim Alam, Advisor. David is now Math and Science Supervisor for the Flagstaff School District, and Alam is District Conservationist for the Flagstaff Field Office of the Soil Conservation Service. Through their dedication and involvement, environmental education has become an integral part of the curricula in Coconino County.

We'd love to help you get started. Please call Sue Lowry or Dr. Jim David at (602) 527-7308 or write us at The Resource

Center for Environmental Education, 2733 E. Lakin Dr., Suite 7,
Flagstaff, Arizona, 86001.

"If we change the world, let it bear the mark of our intelligence."

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BARRIER ISLAND ENVIRONMENTAL EDUCATION CENTER

A Residential Educational Experience in a Coastal Setting

Barrier Island Environmental Education Center
2810 Seabrook Island Road
John's Island, South Carolina 29455
Telephone: 803-768-0429

James A. Turner, III, Director

INTRODUCTION TO BARRIER ISLAND ENVIRONMENTAL EDUCATION CENTER

WHY BARRIER ISLAND?

Barrier islands dot the Carolina coast from the Outer Banks to Hilton Head. Once merely off shore sandbars, plants managed to take root on them, protecting the sand from wind and water erosion. Through the many years, diverse forests grew on them. Today, these islands, including our Seabrook Island, act as "barriers", protecting the mainland from waves, tides, hurricanes and other severe weather systems from the ocean.

Between the islands, in the shallow protected waters, salt marshes also formed. Considered the most productive environments on earth, salt marshes are the birth places of shrimp, oysters, crabs and other commercially valuable sea life. They also provide nutrients for animals and plants living in the ocean.

Barrier Island Environmental Education Center includes each of these environments (ocean, beach, forest and salt marsh, plus freshwater pond) and the many forms of plant and animal life associated with them. Each of these unique environments is a natural "community". Within each community, the individual plants and animals are "interdependent". No plant or animal in the salt marsh, for example, can survive without others. The marsh grasses provide food and shelter for many animals. Egrets, oystercatchers and many other birds depend upon the abundance of snails, crustaceans, fish and shellfish to provide them with a food source. In turn, hawks and foxes feed on these birds. Without these bigger predators, the bird populations would become too large, resulting in an eventual food and space shortage as too many birds compete with each other. Living together in close association, the plants and animals create a certain stability in the community commonly referred to as the "balance of nature".

Even the various communities are interconnected. Offshore in the ocean waters, brown pelicans, sea turtles, gulls and cormorants feed on an abundance of smaller animals. During the spring, these animals come onto the beach to lay eggs. Many of the eggs will become food for raccoons and other predators which find a haven in the coastal forest. Within the forest, freshwater ponds are homes to alligators, turtles, and wood ducks; both the ponds and forest provide food and shelter for them. While deer leave the forest to graze on the grasses in the salt marsh, the raccoons leave the forest to feed on shrimp, crabs and other shellfish there. These smaller animals spend the early parts of their lives in the marsh because of the abundance of nutrients and shelter; later, they move into the ocean waters where many of them become food for the pelicans, sea turtles, gulls and cormorants.

The non-living environment is equally important to the community. The salt marsh is fed by both the in-coming ocean tides and the freshwater streams from inland. Many animals, such as the fiddler crabs, depend upon the regular fluctuations of the tides. The changing seasons and the various weather systems all affect the community.

People are also important members of many natural communities. Prior to English settlement, this area was occupied by various Indian tribes; among them were the Kiawahs, Stonos, and Edistos. The lives of these people revolved around their natural environment. They took food from the sea and shelter from the forests. By clearing small areas of forest and creating fields, they provided habitats for deer and other animals. As predators, they kept the numbers of many animals in check. Thus, they lived within the balance of nature.

With the establishment of European settlements and the plantation system, the natural environment was altered. The new inhabitants had to deal with the problems that developed when they upset the balance. Insects, rodents and 'weeds' were inadvertantly brought into the established natural communities. By clearing large tracts of land, draining swamps, and killing off many of the native animals, the plantation owners had to cope with many new problems.

This trend has continued, in many forms, to the present day. Fishermen discovered that there is not an endless supply of fish and shrimp in the ocean. They also discovered the effects of pollution in the ocean and learned the importance of salt marshes as breeding grounds for the animals they fished for. Many people--those who built houses on dunes too close to the ocean, and those who filled in salt marshes for various developments--learned too late that the dunes and salt marshes protected the mainland from storms. People are continually altering the natural environment to suit their changing lifestyles. And they are altering their lifestyles to suit their changing environment.

Barrier Island Environmental Education Center provides children with the opportunity to study, first hand, the environment around them. Through a variety of activities in an interdisciplinary curriculum, they study many aspects of their natural, man-made and social environment. By casting lines to catch crabs, children learn the value of a salt marsh. By viewing the shoreline, they see the impact of wave action on the beach. By walking blindfolded through the forest, they learn the importance of senses to survival. By spending an hour as Cusabo Indians, they learn the importance of man's relationship with the natural environment.

Above all, Barrier Island is a community in itself. Children, classroom teachers, and program staff spend 3-5 days living together in an environment which stresses "interdependence" within the "group" Just as the interaction of members of a natural community is important to the community's perpetuation, so too is cooperation within the human community necessary for its efficient functioning.

PROGRAM GOALS

Evident in the following explanations of the program goals and class descriptions, Barrier Island Environmental Education Center deals with three major aspects of the environment: natural, man-made and social aspects. For this reason, Barrier Island is more than a "nature center".

--To introduce students to various ecological concepts--habitats, adaptations, variety and similarity, behavior, communities, etc.

In such a short period, our intention is merely to introduce children to these concepts. Many students will develop enough interest in certain of the topics dealt with here that they will want to continue their studies on their own at home: learn more compass skills or crabbing techniques; read more about sea lore and local histroy; start an aquarium or insect collection.

As the week progresses, children realize that none of these concepts are independent from the rest. Communities could not exist without the continuity of seasons and water cycles. Yet seasons and cycles create change. The pattern of regular fluctuation of tides creates the salt marsh and beach habitats. Yet its force constantly changes the beach and salt marsh profiles.

--To put classroom learning into practical application--math (map and compass); social studies (plantation and Indian life); language arts (sensory awareness); science (marine life, forest ecology).

A child often has great difficulty in determining the worth of many subjects. An abstract subject such as mathematics can be very frustrating to a struggling sixth grader. That same sixth grader may become excited at Barrier Island about reading instruments at the weather station where she finds herself using degrees, percentages and other measurements she learned in the classroom. Learning what happend 200 years ago in a history class may be of very little importance to a child until he spends an hour living the life of a slave on a plantation, or doing the activities that Indians in history did.

--To introduce students to topics they will encounter again later in school.

A large percentage of the materials presented in the classes are totally new concepts, ones which in many cases will not be dealt with again until high school or beyond. For this reason it is relatively easy to adapt a given class to eighth graders or second graders with very few changes except in the amount and depth of details.

It is safe to say that most children will leave Barrier Island with more knowledge and understanding of a salt marsh than most adults. They will also be dealing with concepts in ecology, weather and social studies that they will probably not encounter again until high school.

--To enhance healthy teacher-pupil relationships.

Teachers bringing their students to the program in the fall are placed in an ideal position to develop strong personal relationships with their children. If a child likes and respects his teacher, he will be more willing to accept any teaching that the teacher attempts.

Those teachers electing to participate during a spring week have the advantage of spending more time in working with their students to prepare for the experience plus have the opportunity to culminate the school year with this interpersonal relationship. Even at that late time in the school year, students make such statements as, "I never knew teachers wore anything besides suits!" Children see the "human" side of teachers.

--To give children an opportunity to achieve a sense of responsibility while encouraging independence from the home environment.

For many children, Barrier Island will be a first experience away from Mom and Dad for an extended period of time. Some children will adjust to the new environment immediately. Others may have to contend with homesickness for a day or two. Still others may take advantage of their "freedom" from their parents in negative ways. Whatever the reaction, most children will experience a tremendous growing period during their stay at Barrier Island.

--To develop in children a sense of community, or group feeling--acceptance of and cooperation with each other.

Unlike the school environment which stresses individual accomplishment, the Barrier Island experience is based on group cooperation. Children find themselves working constantly with groups of people in different combinations. The child who deals positively with other members of the group is in turn treated with respect and equal fairness.

The girl who pushes her dirty clothes under her friend's bunk may soon find herself with one less friend. The boy who takes more than his share of the dessert from the dinner table will have to answer to the other members of his table group. In an environmental education program such as Barrier Island's, children learn through experience, by dealing with their peers as well as adults in real situations, without being lectured to. Children learn valuable lessons without realizing it. Very seldom are individuals ridiculed for being a different color or for stuttering or for being overweight. For these reasons, discipline is very rarely a major problem.

ORGANIZATION

Barrier Island Environmental Education Center is a non-profit educational service, funds coming directly from the rates charged to participating schools.

The program is directed by James A. Turner, III, a graduate of Salem College, Salem, West Virginia (1980) and with many years of resident environmental education experience. Britton H. Lowry, Executive Director of St. Christopher Camp and Conference Center, coordinates the food and maintenance services and is responsible for the physical facilities.

Physical Set-Up...

The Barrier Island program utilizes the site of St. Christopher Camp and Conference Center: 300 acres of woodland and salt marsh and nearly a mile of beachfront located on Seabrook Island, 25 miles south of Charleston. Children and their teachers sleep in cabins located on the high beach area. Two double cabins house up to 36 people each while four single cabins have a capacity of 9 people each. Thus, groups of up to 108 people can be accommodated.

A heated dining hall and adjacent infirmary are located a couple minutes from the cabins. Two other indoor facilities can accommodate large groups--arts & crafts building, and recreation lodge. An activity field is available for outdoor recreation.

Staff...

The resident (permanent) staff includes, besides the director, a teaching staff of 9-10 college graduates, plus one or two college students doing course work. The teaching staff take the children, in groups of up to 12 students, through their morning and afternoon classes which the classroom teachers select prior to the experience. The teaching staff also lead some recreational activities and run the evening programs.

Medical personnel also live on the site. In addition, there is a full-time maintenance and food services staff along with an administrative staff.

Teacher Involvement...

Each participating school is expected to have at least one representative on the site at all times. The visiting teachers, with the help of parent volunteers, supervise their children over night in the cabins and during brief free periods during the day.

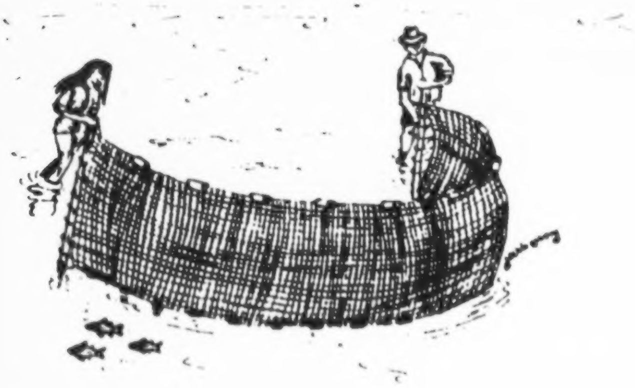
Teachers who desire further involvement can participate in teaching classes. They can teach classes from lesson plans in this manual, team-teach classes with permanent Barrier Island staff, or develop their own classes ahead of time.

Schedule...

As a pre-experience service, the Barrier Island Environmental Education Center will send a representative to the school to set up a schedule with the teachers. Upon request, he will also hold a classroom orientation session for the students as well as present a program at a pre-arranged meeting of involved parents.

The following schedule is a sample of what a typical three-day program might look like. The scheduling of ocean-related classes largely depends upon the tide schedule for that period. Most ocean and salt marsh activities are best done during low tide. The selection of classes is totally up to the classroon teachers. Evening programs also vary.

It is of extreme importance that teachers actively follow up on the Barrier Island experience back at school. We will provide some post-experience curriculum which the teachers may utilize, along with their own ideas; but as it is beyond our realm to monitor any such follow-up activities, we can only hope that this is being done. Most importantly, the values which students began to develop at Barrier Island must be enhanced and perpetuated throughout their daily lives.



Barrier Island
Typical 3-Day Schedule

Monday:

11:00 - 12:00 - Arrival; settle in
12:30 - Lunch
1:30 - Orientation talk
2:00 - Class #1
3:15 - Class #2
4:30 - Supervised recreation
5:25 - Wash up for dinner
6:00 - Dinner
7:15 - Evening program (campfire, night walk, square dance, skit night, environmental hearing, etc
9:00 - Snack
9:15 - Back to cabins
10:30 - Lights out

Tuesday:

7:45 - Wake up; cabin clean-up
8:30 - Breakfast
9:30 - Class #3
10:45 - Class #4
12:00 - Wash up for lunch
12:30 - Lunch
1:15 - Rest period
2:00 - Class #5
3:15 - Class #6
4:30 - Supervised recreation
5:25 - Wash up for dinner
6:00 - Dinner
7:15 - Evening program
9:00 - Snack
9:15 - Back to cabins
10:30 - Lights out

Wednesday:

7:45 - Wake up; start to pack
8:30 - Breakfast
9:30 - Class #7
10:45 - Finish packing; load buses
12:00 - Lunch
1:00 - Departure

EXPERIENTIAL EDUCATION

Barrier Island Environmental Education Center is one of many organizations in the Southeast that offer to schools opportunities in experiential education. The value of educational trips is difficult to measure and often underestimated. The first hand educational experience gained on a worthwhile trip could hardly be duplicated in the classroom. Sometimes classroom learning is restricted to memorizing and learning from books. Experiential education provides students with opportunities to put into practice the knowledge and skills learned in the classroom.

Besides the Charleston area, schools come from as far away as Greenville, South Carolina, Atlanta, Georgia and Raleigh, North Carolina. Many school groups travel for as long as eight hours. Very often two or more schools will participate in the program at the same time. In these situations, students and teachers are mixed in all parts of the program except in the cabins. This technique has proved so successful in exposing students to children from other places and in creating opportunities for social development that many teachers insist upon participating with other schools.

"Horizons and Beyond"...

Another program operated by Barrier Island Environmental Education Center is an educational tripping program known as Horizons and Beyond. Operated with the same basic philosophies as Barrier Island, Horizons and Beyond offers to smaller groups of up to 20 students planned trips to natural and historic areas throughout the Southeast. Trips of varying lengths of time can be planned to coastal, mountain and other inland locations. For more information about Horizons and Beyond trips, contact Barrier Island Environmental Education Center.

CURRICULUM

The Barrier Island curriculum is designed to be a viable extension of the classroom curriculum. Although the classes, for the most part, are based on the ocean environment, they deal with all the major subject areas-- science, math, language arts, and social studies. The class descriptions on the following pages indicate how each of the subject areas fits into the overall curriculum.

In addition, other subject areas are dealt with. Music is a major element in the Barrier Island experience. Singing after meals and music during evening campfires contribute greatly to the development of a community atmosphere. Art is included in a number of the classes and is often offered during afternoon recreation periods. By the very nature of the program, health and physical education are covered throughout the daily schedule.

Two characteristics are evident throughout the Barrier Island curriculum. First, all the classes are activity-oriented. Participation of the entire group-- a scientific experiment on the beach; collecting samples from the pond; following a compass course; a game illustrating food webs; Indian sign language communication--

keeps all participants interested. In this way children often learn without realizing it. Instead of being lectured to, children learn to find answers to their questions through their own efforts.

Second, we do not give written tests. Without the pressure to memorize information for future tests, or to have written assignments completed by a certain date, the atmosphere is more conducive to learning. Activities that are non-competitive, often involving team effort, alleviate the fear of failure, or of coming in last. Classes are applicable to children from a wide range of capabilities and backgrounds. 'Slow' learners are just as apt to succeed as 'gifted' children. Children from city, suburb, and rural area can benefit equally in such an environment.

Three educational strategies are worthy of note. First, the Barrier Island curriculum deals with a conceptual approach. A child will not necessarily leave Barrier Island able to name ten shells, twenty birds and fifteen species of wildflowers. Nor will he be able to recite the scientific name of the channeled duck clam. But rather he should begin to understand some of the many concepts that will be presented to him-- how and why nature and man function. As these concepts are so complex, only a brief introduction can be given to the student in this short period.

Second, we are dealing with affective education. It is well known that children will not learn unless they have the desire to learn. At Barrier Island they see education in a new perspective. Classes are designed to create student involvement and interest, thus making learning an enjoyable experience. They are also living in a relaxed atmosphere sharing positive feelings towards each other and their instructors. Learning is a group effort rather than individually oriented.

Third, it must be kept in mind that the Barrier Island curriculum is not developed to force opinions and beliefs on children. Rather, we are presenting enough information so that they can draw their own conclusions and formulate their own opinions. If, for example, after participating in the "Environmental Hearing" and listening to the pros and cons of barrier island development, a child makes the judgement that parks and condominiums are valuable on these islands, it is not within our limits to try to alter her decision, provided she has used her knowledge and logic.

The list of classes on the following pages include those which have been developed through the fall of 1984. Other topics are possible upon request.

A curriculum guide is available for sale by Barrier Island Environmental Education Center. Entitled "...I Do and I Understand", the book contains detailed descriptions of each class offered at the center. It is a valuable aid for teachers preparing for their trips to Barrier Island Environmental Education Center and will be useful in follow-up discussions in the classroom after the experience.

A DESCRIPTION OF CLASSES OFFERED AT BARRIER ISLAND ENVIRONMENTAL EDUCATION CENTER...

(All classes are one hour long unless otherwise noted.)

Let's Sea (Beach ecology): Concentrates on the beach area between high and low tides. Concepts covered include: beach zonation; tides; barrier beach formation and erosion; animal and plant life on the beach; studies of brown pelicans, bottled-nose dolphins, sea turtles, ospreys, etc.

Behind the Beach (Dunes and salt marsh ecology) (2 hours): The 1/2 mile hike to the salt marsh is via the dunes. The importance of the dunes is discussed as well as plants and animals living there: ghost crab, sea oats, sand spurs, etc. The importance of both dunes and salt marsh areas are discussed. Salt marsh studies include examination of the *Spartina* grass community, food webs, estuaries, fiddler crabs and marsh snails.

(Note: These two classes can be combined into one 2-hour class, also referred to as 'Let's Sea'.)

Seining (Estuary life): (Offered April through October.) Our beach is located at the mouth of the North Edisto River, where fresh water meets salt water (estuary). A 40-foot seining net is used to collect estuary life off our beach; fish, crabs, shrimp, jellyfish, etc. Topics of discussion include: adaptations, feeding habits, tidal movement, and population fluctuations.

Claws (Crabbing): (Offered late March through Thanksgiving.) Included are discussions of safety on the dock, commercial crabbing, importance of crabbing to the Indians, and respect for crabs as living animals. Later in the day, the crabs are cooked and taken to the beach where children can learn how to pick them and eat them.

Pondering Life (Fresh water ecology): A class dealing with both the natural and chemical componants of the pond community. Water test kits are used to analyze dissolved oxygen and carbon dioxide. Also included are studies of fish, insect larvae, algae, water plants, and other organism.

(Note: Pondering Life can be a two hour class combined with Bioscope (see evening programs listings) for a more indepth study of a pond community.)

Woods-stalk (Maritime forest ecology): Particular emphasis is placed on the plant life of the maritime forest. A comparison of trees is used to illustrate similarities and differences between trees. Appreciation for the natural environment is also emphasized. Other exercises deal with food webs, habitats, and adaptations. The "Ancient Dunes Trail" is utilized in expressing the relationship of the maritime forest to the sea.

Entomology (Insect life): (Offered late March through early November.) An intorduction to the many kinds of insects found in various habitats at Barrier Island. Topics include life cycles, adaptations, similarities and differences, and relationships to similar groups of animals.

Wings & Things (Bird life): With the use of binoculars and preserved bird parts (wings, skulls, feet, etc.) students learn about concepts such as habitats, adaptation, behavior, migration, flocking, nesting etc. The beach and forest environments are visited.

Paws (Animal tracking): A class dealing with animal habitats, behavior and adaptation. Children are asked to determine behavior and habitats of animals by examining their tracks. Among the animal tracks investigated are those of deer, fox, bobcat and raccoon, plus smaller animals such as ants and lizards.

It Skinks! (Reptiles and amphibians): (Offered March through Thanksgiving.) Studies of snakes, turtles, anoles and skinks, as well as of toads and frogs. Discussions include proper handling of poisonous snakes, camouflage, and other protective devices. Barrier Island Environmental Education Center has a great abundance and diversity of reptiles and amphibians during warmer months.

Water Moccasin Swamp Trail (Forest and freshwater ecology) (2 hours): (Offered late October through early April.) This 2 mile hike through the maritime forest includes stretches of trail along the fresh water swamp. Topics otherwise covered in all the above forest ecology classes can also be dealt with.

Non-Sense (Sensory awareness): A consideration of our five senses. A hike blind-folded, guided by a rope, is a major activity. Afterwards, children are asked to use their communications skills to express their feelings and thoughts. Other activities illustrate the significance of other senses.

Need-a-friend (Group cooperation challenge course) (2 hours): A series of 13 challenges designed to encourage group, rather than individual, achievement. Various challenges involve squeezing into tight places, lifting each other over barriers, and guiding each other through unfamiliar areas.

Lost and Found (Orienteering): Children learn the basic techniques of using a compass and then put those skills to use through various games and a compass course. Also included are activities involving the use of a map.

Cusabos (Native American life): Discussions and activities revolve around the lives of the coastal Native Americans of South Carolina as well as Native American cultures in general. Topics include sign language, simulation treaty council, and Native American games. An effort is made to dispel some of our misconceptions of Native American life.

Juba (Low Country plantation life): A variety of topics dealing with different aspects of the plantation culture of the Sea Islands: music, crafts, games, slave life. As with the "Cusabos" class, emphasis is placed on an appreciation of different cultures not necessarily our own.

EVENING PROGRAMS

Along with the morning and afternoon classes, the schedule at Barrier Island Environmental Education Center also includes evening programs. As with the classes, these activities are the choice of the participating teachers. They vary from active, group-oriented events to more academic-oriented programs.

New Games: Games taken mostly from books by the same name. They are non-competitive, group-oriented games especially appropriate on the first night as an "ice-breaker" and as a means of bringing the group together. Games include "People Pass", "Smog's Jewels" "Blob Tag", "Lap Sit", etc.

Challenge Night: In groups, students are presented with a series of problems that require mental and/or physical solutions. The challenges involve both team-work and problem-solving.

Dance: Line dances such as the Virginia Reel and circle dances are featured. These are simple dances, easy to teach, so that the majority of the time is spent in dancing, not learning. An occasional square dance might be performed by older groups.

Juba: This is a class that is described earlier in this book that can also be adapted for a large group evening activity.

Crafts Fair (Done with small groups only): Students have the opportunity to do a number of crafts activities: candle-making, mobiles, "God's-eyes", ice cream making, shell jewelry, etc.

Talent Night (Done during 5-day sessions only.): A chance to demonstrate and observe the talent in the group. Various groups of children and adults prepare and then perform various acts: skits, songs, dances, etc.

Environmental Hearing (Fifth grade and older): A simulation town meeting. A hypothetical situation is presented to the students: A corporation wishes to develop an amusement park on an adjacent island. Groups of students are assigned to be either supportive of or opposed to the proposition. A discussion takes place where each group argues its case in a town meeting format. This is an activity that forces students to look at both sides of an issue.

Bioscope Night: A bioscope is similar to a microscope except that it reflects the image upon a wall or screen. Minute pond organisms provide live subjects of discussion, magnified many times. While witnessing these pond samples, students discuss adaptations, behavior, food webs, energy cycles, populations, relationships, and other concepts.

Campfire: On the dunes. This activity can be done at the end of some of the above activities and lasts about one half hour. Singing songs and listening to stories are major activities. On clear nights, astronomy can be included.

Night Walk (Offered mid-November through early March): A walk through the forest using our "night eyes". Sensory awareness, astronomy and searching for animals are emphasized.

OUTDOOR AND ENVIRONMENTAL EDUCATION

BULLETIN IV

Programs, Services and Resources

Board of Cooperative Educational Services

of Nassau County

Division of General Services

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RESIDENT OUTDOOR EDUCATION PROGRAMS

. . . some common objectives

To prepare students for productive and enjoyable lives, a Resident Outdoor Education Program should be based upon their needs and provide them with opportunities to:

. . . become involved in interdisciplinary learning, enabling them to be better prepared to solve their problems now and in the future;

. . . enhance their opportunities for individual achievement;

. . . develop more personal relationships among fellow students and teachers;

. . . take part in activities and planning that will develop conceptual, communicative, and computational skills; and

. . . discover the ecological relationships between man and the natural environment by exploring the ecology of diverse habitats.

Office of Outdoor and Environmental Education

Mr. Norman Skliar, Administrator
Nassau BOCES Outdoor Education Office
Salisbury Center
Valentine Road and The Plain Road
Westbury, NY 11590

INTRODUCTION

Learning frequently takes place through passive, secondhand experiences in the artificial environment of the classroom, but much of the language arts, mathematics, art, social studies and science can be taught better outdoors, in the real world.

Outdoor education embraces all areas of the educational curriculum. It also reaches outward to utilize abundant natural, human and community resources that exist beyond the traditional classroom. Further, outdoor education is a humanistic approach to education. It rests on the belief that learning must address the life goals and interests of students and that learning, at its best, should be viewed as a never-ending process.

With this philosophy in mind, field programs offered by Nassau BOCES Outdoor and Environmental Education are specially tailored to the needs of individual classes, grades K-12. They may be conducted on the schools' grounds or at any of a variety of habitats and locations. BOCES will help teachers and administrators select sites and develop programs that best meet the needs of students. In all cases, the emphasis is on the following:

- Firsthand experiences and direct learning through an interdisciplinary approach
- Close coordination of the program with your school curriculum
- A small-group sensory approach provided by skilled outdoor educators
- Use of all available resources
- Curriculum materials for use with pre and post-trip activities
- Opportunities for future exploration, research and study

When selecting your BOCES program, please note that all activities in the out-of-doors are conducted by BOCES naturalists who are trained to work on all grade levels and subject areas.

Further, all programs offered through the BOCES Outdoor and Environmental Education Program are available to school districts with state aid.

BOCES OUTDOOR AND ENVIRONMENTAL EDUCATION PROGRAMS

BOCES BROOKVILLE ENVIRONMENTAL EDUCATION CENTER
Brookville, New York

Located on forty acres in historic Brookville, this Outdoor and Environmental Education Center offers a variety of homesteading programs designed to instill an awareness and appreciation for the life-styles of Early American settlers. This unique program offers innumerable educational opportunties suitable to all grade levels.

Program Activities offered include ...but are not limited to:

- Outdoor Cooking (apple cider pressing/Autumn only)
- Nature Trail
- Project Adventure
- Blacksmithing
- Orienteering (3rd grade and up)
- Broom Making
- Log Cabin Construction
- Overnight Tenting

Overnight Tenting Experiences at Brookville... The Brookville Center's woodlands are a perfect setting for the pioneering experience of overnight tenting. Students learn the value of teamwork while learning tent-pitching skills and outdoor cooking. This, coupled with a more in-depth involvement with the above mentioned activities, provides the students with a unique outdoor education program.

For a complete description of Brookville's activities, refer to the brochure entitled "Preparing for...The Brookville Experience".

BOCES CAUMSETT OUTDOOR AND ENVIRONMENTAL EDUCATION CENTER
Lloyd Neck, New York

The BOCES Outdoor and Environmental Education Center at Caumsett State Park is located on 1,400 acres of the magnificent former estate of Marshall Field on Lloyd's Neck. The Caumsett experience offers an interdisciplinary approach to learning with a variety of natural habitats to be explored.

In addition to **day programs,** two to five-day **resident programs** at Caumsett State Park offer the students an opportunity to explore the vastness of this undeveloped, unspoiled area. The BOCES resident experience affords the students greater opportunities which are not possible through any day programming.

Program Activities for Day and Resident Programs include...but are not limited to:

- Pond Ecology
- Survival
- Seashore Ecology

- Exploring Caumsett's Past History
- Geology
- Salt Marsh Ecology
- Field Succession
- Orienteering Skills
- Forest Ecology
- Canoe Program
- Animal Tracking (in Winter)
- Target Rock Hike

For a complete description of activities refer to "The Resident Experience" and "Preparing for ...The Caumsett Experience" brochures.

ADDITIONAL PROGRAMS AND SITES

Aside from the BOCES Outdoor and Environmental Education Centers there are several sites listed below that lend themselves ideally to the study of varied natural habitats. These programs can be readily coupled with the on-going school curriculum. All of the following experiences are offered with BOCES trained Naturalists.

JUST BEYOND THE CLASSROOM (JBC)

This program has been developed for teachers and their students to explore and learn more about their immediate environment. The school grounds and surrounding areas are a valuable resource that can be used to enrich classroom curricula at all grade levels. Discover the many natural wonders that lie "just beyond the classroom."

OLD WESTBURY GARDENS

This 18th century English country estate and formal gardens offer a magnificent setting for a look back to the past and a comparative study with the present. A complete tour of mansion and gardens can be arranged with special emphasis placed on a pre-selected topic.

JONES BEACH - WEST END BOAT BASIN

A trip to Jones Beach incorporates a comparative study of bay and ocean ecology within the general seashore ecology program. Some activities includes seining and using plankton nets.

J.F.K. WILDLIFE SANCTUARY, TOBAY BEACH

This preserved wetland marsh system serves as a breeding nursery for offshore marine life and a nesting site for migratory water fowl. It affords a chance to study a natural outwash plain that is indicative of what the entire south shore of Long Island once was.

FIRE ISLAND NATIONAL SEASHORE

A special day trip includes a ferryboat ride, offshore marine water sampling, dune ecology, Sunken Forest visit and study, sand and shore analysis, and art and language arts activities.

"Upstate" Resident Programs

Teachers and students live and learn in an outdoor setting for a full week pursuing an interdisciplinary program keyed to the home school curriculum. The result is a total living/total learning experience that cannot be duplicated in any other setting. BOCES resident programming facilities and locations include:

- **Ashokan Environmental Education Center**
  Kingston, New York
- **Fairview Lake Camps of the YMCA**
  Newton, New Jersey
- **Frost Valley YMCA Environmental Education Center**
  Oliverea, New York

- **Greenkill Outdoor Environmental Education Center**
  Huguenot, New York
- **Mount Tone (Lohikan Centers)**
  Kenilworth, New Jersey
- **Pocono Environmental Education Center**
  Dingmans Ferry, Pennsylvania
- **YMCA Outdoor Education Center - Camp Jewell**
  North Colebrook, Connecticut

Special Education

Using multisensory and interdisciplinary approaches the BOCES Outdoor and Environmental Education programs for the handicapped provide opportunities for a student to use all of his senses to expand self-awareness and understanding of ecological concepts.

In-Service Workshops

As part of its service to local staffs, the BOCES offers a continuous schedule of in-service workshops in such subjects as marine ecology, Long Island geology, pond ecology, ornithology, canoeing, astronomy, environmental art and nature photography. New offerings are developed and scheduled for every season.

All persons wishing to participate in BOCES Programs or seek further information may phone:

Mr. Norman Skliar, Administrator
Office of Outdoor and Environmental
Education - Nassau BOCES Salisbury
Center - (516)997-8700, Ext. 266

In order to:

- discuss programs available as described in this brochure
- discuss the cost of the program
- receive necessary curriculum materials
- discuss other special program activities

Nature's Classroom -

SCICON

Reprinted by permission of the Tulare County Department of Education, Dr. Dean Hall, Superintendent, and Norris W. Beakes, Program Manager.

Philosophical Credo of SCICON

"SCICON is an instructional program which is deeply rooted in an optimistic faith in the worth of man; it is an expression of faith in his educability and perfectibility."

The philosophical credo of SCICON is founded on the belief that man can survive and prosper in a natural environment if given the opportunity to learn about that environment and alternative ways to interact with nature. Through this learning and interacting, man's life is enriched and he leaves his environment with a brighter future because of his involvement. The credo is predicated on the belief that if man is educated to know the truth, he will speak it; if he is sensitized to beauty, he will serve it; if he learns to know the goodness of nature, he will manifest this knowledge in his daily relationship with his fellow man and his environment.

People must be made aware of the current environmental dilemma. Mankind may have already created an irreversible set of circumstances which he can no longer control, and for which he may have to pay the ultimate price. No longer can scientists alone make decisions concerning human survival. Decisions concerning the future of our planet are made daily by everyone in subtle ways. Protecting our environment is a moral decision made by individuals as stewards of the earth. It is their obligation to other human beings - both living and unborn.

Every day it becomes a matter of more urgent concern that we provide the knowledge and skills necessary to make rational and compassionate environmental decisons to the general public just as much as decision-makers at higher levels. Thus the primary mission of SCICON is to educate, prepare and enlighten the young to become the wise and concerned environmental decision makers of the future.

What is SCICON?

SCICON is the acronym for the Clemmie Gill School of Outdoor SCIence and CONservation Education. Its instructional program is aimed at opportunities to learn about science, conservation, and ecological relationships in nature's own classroom. The SCICON campus is located in the foothills of the great Sierra Nevada Mountains of California. Primarily serving sixth graders from schools in central California, students from Tulare, Kings, Fresno and Kern Counties spend one week at the site, living in cabins and studying in the out-of-doors.

The program began in 1955 with no permanent facilities and only a few school districts participating. Currently, nearly 5,000 sixth graders attend the resident program and fifth-grade day students, high school students, and other groups bring the total to over 15,000 visitors annually.

The campus is situated on 1,170 acres of oak-forested foothills through which Bear Creek flows. All existing facilities on the site were constructed with donated funds, mainly raised by the "Friends of SCICON", a non-profit organization established to provide financial support for the school. Strong community support and many dedicated volunteers have made the SCICON dream a reality. Additional facilities made possible by SCICON supporters include a museum, library, planetarium, observatory, handi-cabin (for the handicapped), learning center, barbecue shelter and barbecue, amphitheater, firehouse, modern shower/restroom facilities, and staff housing.

The Clemmie Gill School of Outdoor Science and Conservation Education is operated by the Tulare County Department of Education under the direction of the Tulare County Superintendent of Schools. The program is administered by the Program Manager and on-site administrators under the supervision of the Assistant Superintendent of Instruction.

The actual staff is comprised of various levels of instruction personnel:

Naturalist: These are adult para-professionals with extensive knowledge and background in special areas of environmental education. The Naturalists are primarily responsible for trail interpretation and baseline instruction of a variety of subjects, such as geology, astronomy, interdependencies in nature, plant, animal and bird identification, Indian history and lore, as well as many more integral and interrelated subjects.

Program Specialist: The program specialist is primarily concerned with program management and instruction related to the special and unique outdoor school curriculum areas. These include the garden studies program, energy/alternate energy program and the Library/Museum program.

Interns: Interns are college or pre-college students who are gaining off campus work experience or are fulfilling college program internship requirements in the fields of environmental or recreational education. Interns are selected from applicants all over the United States. The primary duties of the Intern involve trail orientation and interpretation, organizational duties (dining hall, campfire programs, folk dancing, elective classes), Boy's and Girl's Village Chiefs (supervision of cabin counselors and Village discipline) and housekeeping and maintenance. The Intern, after the successful completion of a semester or full year experience, will be qualified for full time employment as a camp director, outdoor school program specialist or recreation specialist.

Cabin Counselors: Students are chosen from Tulare County High Schools to serve as cabin counselors. After their arrival at SCICON, or prior to going to SCICON, the counselors are given a full orientation on the overall program and helpful hints for success in dealing with the students attending the outdoor school. They sleep in the cabins with the outdoor school students and accompany the children on all trail walks.

Classroom Teachers: The classroom teacher is an integral member of the overall SCICON team. These teachers spend a great deal of time preparing their students for their exciting experience at SCICON. On the SCICON site, the classroom teachers participate on trail walks and spend very special moments during "teacher time" with their students. After returning to their home district, the classroom teacher conducts several follow-up lessons based on the knowledge and experience the students were exposed to during their week at SCICON.

The program support staff comprises of two secretaries that carry out all office functions, maintenance staff and four cooks. A registered nurse is on the SCICON site on a 24 hour basis to serve the medical need of students and staff.

Objectives of SCICON

To help all who are influenced by the SCICON Program either directly or indirectly the following objectives have been established:

I. TO PROVIDE OPPORTUNITIES for the acquisition of new knowledge, clearer understanding, greater awareness, and expanded concepts for learning and living.

II. TO STIMULATE the development of questioning attitudes for the solution of human problems and the enrichment of life.

III. TO ESTABLISH ENVIRONMENTAL CONDITIONS and climate which will nourish those seminal elements of creativity so they may freely give form, utterance and substance to the meaning of life as they conceive it in beauty and truth.

IV. TO PROVIDE A CENTER OF STILLNESS where children and men may come from the turmoil and noise of life for contemplation and reflection for examination of their attitudes toward themselves and toward other men.

V. TO ENCOURAGE A SENSE OF WONDER and a feeling of reverence for the strong and great forces of life which is vast and filled with mystery and challenge.

SCICON Curriculum

Self-reliance, democratic living, moral and spiritual values, health and safety, social skills, patriotism, recreational skills and creativity all have a significant place in the educational program at SCICON. However, the primary instruction emphasis is centered around five major concepts:

√ ***ENVIRONMENT***
√ ***ENERGY***
√ ***INTERDEPENDENCE***
√ ***CHANGE***
√ ***APPRECIATION***

These major concepts are woven throughout the specific and comprehensive curriculum of SCICON. Students receive first-hand experience with the forest community of plants, birds, animals, insects and reptiles. Lessons are conducted on water, soil, air and minerals. Students are introduced to the subject areas of astronomy, geology, biology, meteorology, ethics and a variety of environmental studies. They receive work experience performing housekeeping and dining hall duties, and social skills living in a cabin group. Music, art and physical education are all a part of the hands-on, experiencial instruction program at SCICON.

Twice a day, students participate in two-hour trail walks. Trails are conducted by SCICON instruction staff, and each has specific learning outcomes, objectives and vocabulary provided in a written outline. A specific schedule is followed each day of the week with instruction time intermixed with leisure providing a wide variety of activities.

SCICON Funding

SCICON operates 12 months a year. Currently, SCICON operates without tax support or other public funds except for those received from the Tulare County Department of Education in its role as coordinator of the program. The major source of funding for the program is income from contracting school districts. Charges per student vary from $70.00 to $95.00 per student, with the lower fees charged to the districts who have contributed to the building of SCICON, and the higher fees to out-of-county districts.

When not in use by students, SCICON has become a major conference site for private and public groups. Conference fees are charged via a written contract, thus generating additional operating funds for the school.

Through the dreams of a few and the labors of many, SCICON has become a reality. The mission of SCICON, to teach the young to preserve, conserve and appreciate nature, continues.

"All the flowers of all the tomorrows are in the seeds of today" - Chinese proverb

For more information about SCICON and its instructional program contact: Norris W. Beakes, Program Manager, Clemmie Gill School of Science and Conservation Education, Education Building, County Civic Center, Visalia, California 93291, (209) 733-6386.

WEDNESDAY SCHEDULE

7:00	Rising Bell
7:15	Gopher(s) Bell - for meal set-up, preparation of flag salute and raising of flag at flagpole
7:30	Flag Bell - Present flag, Pledge of Allegiance and Conservation Pledge
7:45 - 8:30	BREAKFAST
8:30 - 9:00	Cabin Clean-up
9:00 - 11:15	ACADEMIC TRAIL TIME
11:15 - 12:00	Teacher Time - activities planned by visiting staff
12:00 - 12:15	Students meet cabin counselors and return to cabins
12:00	Gopher Bell
12:15 - 1:00	LUNCH
1:00 - 2:00	Student's quiet time in cabins; showers
2:00 - 4:15	ACADEMIC TRAIL TIME
4:15 - 4:30	Snack
4:30 - 5:15	Teacher Time - activities planned by visiting staff
4:30 - 5:30	Astronomy Slide Show - sign-up students, only- Exeter House
5:15	Students meet cabin counselors at Lodge and return to cabins
5:15	Gopher Bell
5:30 - 6:15	DINNER
6:15 - 7:15	Counselor directed activity Cabin group takes down flag
7:15 - 8:30	NIGHT HIKE
7:15 - 8:30	Astronomy - sign-up students, only - Observatory
8:30 - 9:00	Hermit's Story
9:00 - 9:30	Bedtime preparation - V. C. cabin check

ENERGY TRAIL OUTLINE

OBJECTIVE: to develop awareness of, and appreciation for three categories of energy: 1)energy for the human body, 2)energy cycles in nature, and 3)energy sources for heating, electricity, and transportation

VOCABULARY:

- energy
- conservation
- natural resources
- alternative
- fossil fuels
- geothermal
- recycle
- interdependent
- photosynthesis

I. INTRODUCTION

Subjects:
- A. Energy: what it is; where it comes from
- B. Natural Resources: what they are; how we need energy to transform them into something useful for us
- C. Conservation: what it means, how we can help

Teaching Activities/Tools:
- A. Solar ghetto blaster, black and white board
- B. Renewable and nonrenewable resources display board
- C. Discussion

II. PEOPLE ENERGY

Subjects:
- A, Six things we need: food, water, oxygen, sleep, exercise, and attitude
- B. How to conserve our energy: walk, don't run; small steps on steep uphills; think positive thoughts

Activities/Tools:
- A. Discussion
- B. Pulse-taking at rest and then after exercise; trying big then small steps on a steep hill

III. ENERGY CYCLE

Subjects:
- A. The sun, through plants and photosynthesis, is the source of almost all energy on earth, including natural energy cycles (or life cycles).
- B. Every living thing is part of a natural interdependence for energy
- C. The cycle's balance is disrupted with the loss of any organism

Activities/Tools:
- A.Discussion
- B. Create-a-cycle with a piece of yarn

IV. ALTERNATIVE ENERGY SOURCES

Subjects:
- A. Fossil fuels: the problems we have with them now
- B. Alternatives: what they are, what factors to consider in determining which alternatives are our best choices
- C. Our own responsibility to think about how our actions effect the environment

Activities/Tools:
- A. Time-line yarn
- B. Solar 'toys', pinwheel, static wheel, discussion
- C. Imaginations by a pool of water

V. CONCLUSION

Subject:

SCICON is EVERYWHERE: what sixth graders can do to help conserve energy and natural resources; and why they should want to

Activity:

1. Discussion
2. Trash gifts
3. Test

GREEN CHIMNEYS FARM CENTER

AND

HILLSIDE OUTDOOR EDUCATION CENTER

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Prepared by:
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INTRODUCTION

Green Chimneys School operates 2 outdoor education and rural education programs in Putnam County, New York: Hillside Outdoor Education Center located on a 60 acre site in Brewster, New York, and Green Chimneys Farm Center - a demonstration farm program on a 150 acre site in Patterson, New York. The centers are less than a mile apart.

The enterprise was formed in the early 70's as a non-profit educational activity for the purposes of expanding the range of outdoor experiences offered to the students of Green Chimneys to provide schools and agencies with special education programs that encourage wide use of the outdoors and to increase the use of the Green Chimneys facility by the general public with the goal of intermingling various groups for the betterment of all concerned.

From the early beginnings, outdoor programs and activities were designed to serve the total educational needs of all children. The campus provided the school curriculum enrichment areas where practical problems in core subjects could be presented and solved. At Green Chimneys Farm Center emphasis was placed on animal husbandry, gardening, indoor plant care, farm studies and horseback riding. At Hillside the center offered elementary and secondary school programs in outdoor education and science, stressing direct experience in forest studies, animal recognition, pond and water studies, wilderness crafts, orienteering and the like. As Green Chimneys School gradually adapted its program and personnel to serve emotionally disturbed and learning disabled youngsters, the educational, recreational and therapeutic values of farm and nature programs became increasingly evident.

Outdoor activities came to play an equally important role in encouraging family participation in the programs, which is essential to fostering the return of students to their families and communities. This observation became a key element in the decision to "go public" with the outdoor education programs.

With the acquisition of an abandoned 60-acre summer camp facility in Brewster less than a mile from Green Chimneys School, a decision was made to broaden existing programs and place greater emphasis on creating year-round programs for the general public. The purpose was two-fold. First, the program wanted to counter already widespread public objections to "closed" child-care institutions by giving resident children an opportunity to mingle with and work with other children and adults. By learning to develop better understanding of one another, outsiders and residents can act as a catalyst between the institutions and the community. Secondly, the program was determined to preserve natural open spaces where both a child and an adult could come to learn and understand man's necessary dependence on the environment. For a period of time the centers were linked to two other programs including one operated by Green Chimneys in 1979 in New York City, to expand on these ideas by exploring the environment in a large metropolitan setting. The New York City program has since become a completely separate organization.

PROGRAM PURPOSE AND GOALS

A statement of purpose describing the programs was published in 1977. It adequately reflects the organization's philosophy. The Centers:

> exist to provide opportunities to enhance the academic, social and aesthetic growth of individuals of all ages and to encourage them to develop their full potential as human beings. This is done by traditional as well as alternative methods. Learning is most efficient and effective when based on the hands-on or sensory awareness approach. Our participants are encouraged to develop a concern for others and a sense of personal awareness through direct experience. We believe that learning takes place in many environments. Our primary emphasis is on the greater use of the out-of-doors as a learning resource. We awaken the participant to the many learning opportunities afforded by the outdoors. Learning is approached as an inter-disciplinary and multi-disciplinary activity. Outdoor education is designed to serve as a curriculum enriching and life enriching process enabling the learners to appreciate and understand the world of which they are a part. We are educating for a better understanding of the inter-relatedness of all things on "Spaceship Earth".

In educating for a better understanding, it is especially important to become aware of the needs of the urban child and his family, the handicapped and others less fortunate. The primary emphasis of the program is on the greater use of the outdoors as a learning source.

New programs are continually being developed by each of the centers, but all new programs must hold the promise of being able to be financially self-supporting and within the reach of the majority of the people served. Careful planning must ensure that only a modest, initial investment is required to begin new programs and that these programs are philosophically and physically acceptable.

FACILITY AND SITE/PROGRAM DESCRIPTIONS

Hillside Outdoor Education Center

Hillside is an educational facility where groups may come for a day, overnight, or for a week-long or weekend stay. The Center is situated on a 50-acre wooded hillside which includes a forest, a nature trail, a 19th century homestead site, a sugar maple grove, camp sites, climbing wall, ropes and challenge courses and cooking areas. The facilities at Hillside consist of two winterized dormitories that accommodate a total of 72 people, a library/resource room, and several meeting rooms. A log cabin is used for program activities. A full-time staff of professional outdoor educators and a corps of outdoor education interns serve as resource specialists and assist groups in planning and conducting school sites as well as day and resident outdoor education experiences while at the Center.

The resident outdoor education program involves children and adults living and learning together in the outdoors for a specified number of days and nights, and using the outdoor environment to make learning more meaningful.

The resident program provides educational experiences by affording the opportunity for young people and adults to see each other in a relaxed and informal setting, which improves relationships between human beings and develops understanding, respect, and appreciation for one another. The group's togetherness results in young people and adults living and working together cooperatively toward common goals.

Hillside's professional staff of outdoor educators conduct an orientation session prior to the resident program, assist with instructional lessons during the program, and provide follow-up sessions. The center's interns, who are receiving training in the methods of outdoor education, assist with the program needs of visiting groups. Energy, environmental, and world concerns are taken into consideration. Well-balanced meals are prepared and served as part of a nutrition education program.

Each year Hillside Outdoor Education Center offers summer camp programs to provide day and resident experiences in outdoor education. Since 1972 the camp has grown from day camp for 6-12 year olds to include programs for nursery school, young teens, overnight camp, as well as specialized farm programs through Green Chimneys Farm Center.

Hillside's summer programs are staffed by full time professional outdoor educators and college students who are highly qualified to teach environmental studies and outdoor skills. All staff are trained to serve the needs and interests of the various camper age groups. Camper groups are kept small to assure individualized attention and to encourage participation by all.

A new dimension in adventure was designed especially for the older day camper. Camp activities are supplemented by various adventure offerings to keep this group challenged and stimulated throughout their camp experience. Hillside offers dormitory facilities for overnight camping programs during the summer.

Nature's Nursery, which was begun as part of Hillside's day camp, is in its fifth year as the area's most unique year-round children's center serving children from 2-5 years of age. In addition to the typical pre-school activities the program includes a wide range of plant and animal activities as well as daily involvement in outdoor education.

Through an arrangement with the local public school district, Nature's Nursery offers a Before-After School Program to elementary age youngsters. A special staff provides educational and recreational outdoor education activities for this group.

Green Chimneys Farm Center

Green Chimneys Farm Center is on the campus of Green Chimneys School, a residential treatment center for emotionally disturbed children ages six to fifteen. The farm is situated on a 150-acre site which includes a stable, an indoor riding ring, an activity area, teaching barn, solar greenhouses, gardens, orchards, pond, fields, forest, river, and self-guided nature trail. A variety of livestock is raised.

The Livestock Collection has become the most popular drawing card over the past few years. Here visitors can see, touch and learn care of a range of farm animals not to be found on today's typically specialized farm. The collection includes horses, ponies, dairy and beef cattle, donkeys, goats, sheep, all sort of poultry including waterfowl, rabbits and pigs.

The Teaching Barn incorporates a classroom adjacent to the animal stalls, which enables animals and equipment to be brought into the classrooms for demonstrations, exhibits, hands-on lessons, clinics and workshops. The Farm Machinery Exhibit provides working demonstrations of plowing and forage harvesting and offers recreational wagon and hay rides.

The Garden Center allows staff to demonstrate the propagation, cultivation and harvesting of a variety of vegetable crops. In the solar greenhouses demonstrations of horticulture practices are offered year-round, which illustrate the practical applications of solar energy for heating and ventilating. An aeroponics unit was installed in 1985.

Utilizing the stock trailer, pick-up truck, van and station wagon, farm exhibits travel into urban areas. The program is called Farm on the Moo-ve. When the staff and farm guides (Green Chimneys students) move off site they carry with them cages for small animals; literature racks; poster display panels and arts and crafts materials; farm, garden and applied technology materials. Demonstrations are also available which illustrate uses of various hand gardening tools, how to conduct soil tests, the use of organic fertilizers, safe application of plant-derived pesticides, how to construct and maintain simple windowsill flats for later winter plant propagation and how to care and nurture indoor plants.

Each year an annual farm day for the handicapped is conducted by inviting area residents and their families to enjoy a free day at the farm. The activities include tours, pony cart rides, hay rides, and gardening. Little Folk Day brings hundreds of pre-schoolers to the site twice a year.

An extensive equestrian program is conducted at the farm. An indoor riding ring guarantees year-round programming. The program follows the guidelines of the North American Riding for the Handicapped Association. Certified instructors conduct all programs.

During the summer a specialized day camp focuses on horse care and riding. Vaulting, driving, lunging, tacking, grooming horse care and feeding and basic first aid are offered to children from 8-13 years of age.

Green Chimneys Farm Center conducts a special program for local physically and mentally handicapped youth and adolescents. The program, UTAP (Using Talent with Animals and Plants) is a year-round educational and recreational outdoor program designed to serve those with special needs. Mental, physical and emotional growth is fostered through participation in outdoor education and farm activities.

UTAP aims to provide opportunities for creative use of leisure time, free from community pressures. The farm provides a variety of activities such as farming, horseback riding, outdoor education, and physical education to assure each individual an opportunity to participate in some activity. This helps each participant to accept his/her disability and enables the person to take advantage of all community activities. The program provides instruction in techniques and skills which might create a basis for a lifelong hobby. It is also the intent to educate the community, both by personal and group contact, as to the abilities and capabilities of exceptional children and adults. Therapeutic riding and swimming instruction are provided with the assistance of other residents at the school allowing for the additional benefit of peers helping peers. The children in residence who are service receivers become service providers through this approach.

ADMINISTRATIVE STRUCTURE

Personnel

The Centers serve approximately 150 Green Chimneys young people in residence in one of the agency's programs and over 25,000 other people each year. The permanent outdoor education staff numbers around 15 people. Each program is administered by a full-time director. There are program specialists at each center. An administrative assistant serves as a secretary and bookkeeper. Maintenance personnel and cooks of Green Chimneys serve at Hillside for the residential programs. Hillside and Green Chimneys Farm receive any and all support services from the child care program. Staff includes early childhood specialists, environmental science teachers, outdoor educators, adaptive physical educators, horticulture and farm science persons, therapeutic riding instructors, experiential educators and adventure specialists. Many have had some special education training or are now in a masters degree program in special education. Some of these people work almost entirely on the programs offered to the public. There are always interns from colleges and universities from around the country involved in the activities of the centers.

Professional Preparation

A major thrust has been in the area of professional preparation, which has been accomplished in a number of ways. The most common occurrence is through the sponsorship of one day conferences and weekend workshops. Topics at these workshops vary from winter experiences to farming, horticulture, animal care, animal facilitated therapy, ropes and challenge courses, residential farm weekends, acclimatization, and curriculum enrichment through the out-of-doors. Another approach has been the co-sponsorship with other groups and agencies of a series of meetings or workshops.

The intern program is the result of a commitment to professional preparation. Whereas no one would deny the service value of the interns, the obvious need for supervision and training requires much time and effort on the part of the staff. The uniqueness of the facilities enables interns to work with the typical and atypical youngster. This provides future options to the intern which might not have been possible to acquire at other centers.

Green Chimneys Farm Center is a field placement site for the Mercy College (Dobbs Ferry, New York) New York State approved a program in Pet Assisted Therapy Facilitation. It is also the site for Mercy's course in large animals offered as part of the sequence for veterinary technicians.

In August of 1986 the farm will host a pre-conference tour by participants in the Delta Society's International Conference of the Interaction of Animals and Humans.

FUNDING

Past experiences have shown that while the ultimate financial success and stability of the organization is assured, the longed-for goal of economic self-sufficiency has to be constantly in mind and worked on every day of the year.

Each program or center is funded in different ways. Descriptions of the methods or strategies used by the centers are as follows:

Green Chimneys Farm Center

Income from public programs at Green Chimneys Farm Center is limited because of its location, therefore, the Farm-on-the-Moo-ve was initiated so that animals can be transported off site to reach many large groups. Outside support is required to help the agency defray the cost of the program since the per diem for institutional care is not sufficient to meet the total cost. Each year there has been increases in income from sales of Farm produce and livestock and increases in income from agency and school groups. Expansion in numbers of programs available and varied approaches to horticulture have been carried out. The solar greenhouses and the aeroponics unit have facilitated the expansion. Growth in program quality and quantity depends on increased revenues. Fund development is an on-going task. The UTAP program is a source of income. Programs of all sorts involving the horses including riding clinics also add to the overall income.

Hillside Outdoor Education Center

In order for Hillside to reach youngsters from inner-city school districts costs for the program must be within reach. School districts are having difficulty providing funds for transportation for either day or residential outdoor education programs. There has been a desire to reduce school costs by taxpayers and this has an effect on our ability to attract groups. Fees for each program must not be so high that the vast majority of our target audience would be excluded. To continue serving urban children from New York and neighboring metropolitan areas, fees are being kept reasonable. An on-going effort is being made to obtain funding for particular programs.

The primary source of income for Hillside is residential programs serving both urban and suburban school groups. A source of secondary income has come from summer camp. A great deal of effort has been given to this source of support. Additional income comes from day visits and week-end activities. On-site programs at various community schools, libraries, and organizations add to available income. Additionally, the internship program is considered to be very important to the overall operation of the centers. It permits greater use of the facilities and increased services of the site through the combination of permanent staff and interns. The advantages of the Hillside program to the children at Green Chimneys must not be overlooked. Not only do Green Chimneys School youngsters participate in the Hillside programs but most groups at Hillside make us of the farm. The advantages are self-evident.

Supportive Agencies

Local funds have become an increasingly important source of support. As the centers continue to meet community needs, the public has been willing to help support community programs carried out by the centers. It is safe to predict this will continue. Programs for persons with handicapping conditions, youngsters on probation and the learning disabled adolescents in the Putnam-Fairfield area are on-going. Work with the group homes and residential programs of other agencies have increased our visibility in terms of working with troubled youth.

Efforts continue to explore foundation, corporate and federal funds to support research and demonstration projects, curriculum development, or publications. We have been successful on a number of occasions. Proposals to the Institute for Museum Services have been approved twice in the past.

The process of making corporations and private foundations aware of all the programs offered is continuous. The fund development program is directed towards this very important group. Funds have been received for capital improvement, for operating costs and for special projects from private foundations for many of the outdoor education programs.

For more information on the centers contact:

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(914) 279-2996
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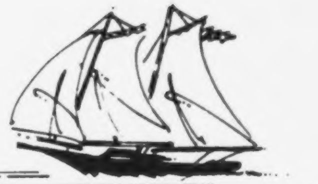
MSUS
MARINE SCIENCES UNDER SAILS



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MARINE SCIENCES UNDER SAILS / SCHOOL OF ENVIRONMENTAL EDUCATION

OVERVIEW
OF
ENVIRONMENTAL EDUCATION PROGRAMS FOR SCHOOLS

Marine Sciences Under Sails (MSUS) is a non-profit marine science and sailing organization incorporated in 1976 and dedicated to the education of all ages through the appreciation and understanding of marine life and man's interaction with the sea. In 1981 MSUS expanded its program offerings to serve school children through the **School of Environmental Education (SEE).** The primary areas of study are mangrove and barrier islands, shallow seas, coral reefs, hardwood hammocks, and the wetlands of South Florida known as the Everglades.

South Florida's relationship to the sea has historical as well as future significance to its people and the rest of the world. Through education, the understanding and desire to retain this relationship becomes reality. Because of the unique hands-on, get wet programs offered by MSUS' School of Environmental Education, the students of every grade level have an opportunity to become aware of the vital role the sea plays in their lives and the necessity for protecting it as one of our major natural resources.

TARGET POPULATION

MSUS/SEE makes its programs available to students in grades kindergarten through grade 12 from both public and private schools throughout the State of Florida and the nation. The classes represent average, gifted, and alternative education groups. The ages of these children range from 5 to 18 years. In addition, MSUS/SEE makes its programs available to adults, teachers, and youth from rehabilitative centers. The total number of students-days involved in our programs has grown from 1637 during the 1981-82 school year, to 2934 during the 1983-84 school year, 3829 for 1984-85, and eventually to 5879 for the school year of 1985-86.

PROGRAM DESCRIPTION

The MSUS/SEE organization is operated by a group of marine biology and environmental educators, directed by Ned E.J. Webster, who realize the importance of environmental education to the present and future citizenry of the South Florida area. All instructors involved with MSUS/SEE must have earned at least one degree in biology or a related field and are required to go through a field training program with students under the direction of experienced field instructors. MSUS/SEE currently employs 5 full time and 8 part time field instructors. Each instructor joined the instructional staff as the MSUS School of Environmental Education programs were developed and most of them are from the original staff.

The outdoor environmental education programs offered include **one-day** as well as **three-day** field studies at specific locations representative of typical South Florida ecosystems.

THREE-DAY RESIDENT PROGRAM

The three-day program, recommended for grades four through twelve is currently held in the Florida Keys at the **Boy Scouts of America's facility known as Sea Base**. Separate dormitories for male and female students provide the accommodations necessary for 38 children and accompanying chaperones. A cafeteria provides the meals served during the three day, two night period.

All instruction on fieldtrips to the shallow bay, sandy shore, coral reef and mangrove islands is the responsibility of the MSUS/SEE staff. Soon after the students are settled into their dormitories they are issued snorkeling equipment, personal flotation devices, then given individual swimming tests and snorkeling skills instruction. A record is kept of those students who need special attention while in the water.

There are a total of six formalized study sessions, four of which involve three and one half hour in-depth field studies with small groups of students and two general sessions during the evening for one to two hours each. A brief description of each session is outlined below:

IN-DEPTH 3 1/2 HOUR STUDY SESSIONS

MARINE SCIENCES -

Coral Reef Ecology: Groups of 10 to 13 students are transported by boat to both a soft coral community and a hard coral reef off Lower Matecumbe Key. Students snorkel with the instructors and learn to identify the various types of coral and marine organisms within the two ecosystems.

Shallow Bay Ecology: Small groups of students snorkel along the shoreline of the bay side of Lignumvitae Key as well as around the isolated islands and shoals in Florida Bay. Although most of the identification of marine organisms and discussion of interdependence is carried out on site, certain specimens are selected for later study.

Mangrove Community: Students investigate a mangrove swamp from within as they snorkel to and around an island composed primarily of mangroves. Once on the island, animal species which inhabit the system are located and examined. Activities and field discussions are designed to illustrate the importance of this unique ecosystem to South Florida.

Hardwood Hammock Hike: On this 1-mile hike, students learn to identify native vegetation of a dry land, island hammock as well as the historical significance of these high ground semitropical areas.

EVENING PROGRAM OPTIONS -

Plankton Analysis Lab: After collecting plankton with a tow net behind a boat, collection jars are brought into the laboratory for microscopic study and comparison along with other selected marine specimens.

Unseen Critters Lab: So many inconspicuous marine organisms go unnoticed during daytime studies. Here, many "never-before-seen critters" are placed under the microscope and their characteristics and behavior observed. Discussion of their special structures, structures' function, and the organism's niche in the ecosystem then takes place.

Davey Jones' Treasure Hunt: Teams of students are provided with a list of marine organisms which might be found along the beach and bay. Equipped only with buckets and flashlights, competing teams of students attempt to find as many items on the list as possible. Proper identification is required before specimens are counted and returned to the environment. This educational game reinforces information they encountered during previous field studies.

FLORIDA HISTORY AND SOCIAL STUDIES -

This is a program alternative also in place at Sea Base. It is available to history and social studies teachers during cool months (January and February) and who require engaging, outdoor types of educational activities for there students. These field studies and evening programs are designed to supplement the regular classroom Florida history and social studies curriculum with subject material and experience not normally available to the teacher.

Indian Key State Historical Site: The usual group size of 13 students, a teacher and a field instructor travel by boat to Indian Key. The MSUS/SEE instructor leads the group on a narrated tour of streets, building foundations and cisterns of an early 1800's island village. The villager's life style, specific personalities, means of personal income including the history of wrecking, and the fateful attack on the village by Indians are discussed. Theories about the reasons for the Indian attack on this village and the lighthouse on Cape Florida are presented. This leads to an enrichment discussion of Florida's Seminole Wars.

Indian Key lies in full view of Alligator Reef Lighthouse. The curriculum requirements of the teacher dictates the amount of discussion about the history of these lighthouses, the USS Alligator and piracy in this section of the Caribbean Sea. Some of these topics are presented during evening programs with flavor added by the instructor's costume.

Lignumvitae Key State Historical Site: Small groups of students are transported to Lignumvitae Key where they are lead on a narrated tour of an island family homestead of the early 1900's period. A fully furnished home of this period along with freshwater cisterns and a hurricane shelter are maintained for educational purposes.

Long Key State Park: This 15-passenger van trip to Long Key from Sea Base carries students passed abandoned bridge abutments and along the old Overseas Railroad bridge. Narration includes historical information about these sites and impact of Henry Flagler's railroad on the lives of people living in the isolated Florida Keys. The story of the 1935 hurricane is related to man's engineering mistakes and the role of mangroves in stabilization and protection of islands, people and property.

Sea Oats Beach Studies: Small groups of students are led in the study of the origin of sand, formation and stabilization of beaches by native plants, and why modern man should not build on or near sand beaches. Sea turtles, nesting habits and the history of the turtle hunting for food and commercial purposes, and resulting turtle population decline are discussed.

Under the supervision of the field instructor, natural material that has washed ashore and dried by the wind and sun are collected for later use during an evening program.

EVENING PROGRAM OPTIONS -

Natural Marine Art Appreciation: Using glue, paper and natural materials that the students collected during their fieldtrips, they create pieces of children's art, such as shell sculptures, herbarium mounts, or driftwood designs. Both art and craft skills are encouraged during these evening sessions.

Ways People Make a Living From the Sea: This is a lecture program illustrated with 35mm slides. As a result of cruising small sailboats and visiting island settlements in the Bahamas and off the coast of Central America since 1975, MSUS participants and staff have gained insight into human living with the sea in the past and present. The purpose of the resulting slide-lecture program is the leave the audience with a better understanding of what it was like to travel, work and live in the Florida Keys during the pioneering phase of history.

Ethics of a Savage: This is the story of Chief Seattle and his conservation philosophy which is presented by MSUS/SEE instructors in a skit format. The skit is followed by questions and a discussion to evaluate information transfer to the students.

Although the majority of the activities revolve around science, other subjects are emphasized as well. Original poems and stories are written about the various ecosystems. The lives of early pioneers and Indians are sometimes acted out in plays created by the students and instructors during evening activities. Most evenings end with the whole group singing specially adapted "songs of the sea".

FINANCES

The materials used in this program, such as the boats, life jackets, and snorkeling gear are rented to MSUS/SEE from Sea Base and are included in the three-day program fee of $110.00 (1986-87 academic year) which each child pays. Many participating schools plan fund raising activities to help cover the cost of the program. The materials needed for the direct instruction are the property of MSUS/SEE. Transportation to and from the facility is the responsibility of the individual school. Our resident type programs for the 1985-86 school year total 2260 student days. MSUS/SEE is supported solely by fees paid by the participants.

ONE-DAY ENVIRONMENTAL EDUCATION PROGRAMS

Florida Keys and Everglades -

The one-day program study options include mangroves, tropical island high land, shallow bays, and coral reefs at John Pennekamp Coral Reef State Park and Koblic Marine Center in the Florida Keys. MSUS/SEE provides the transportation, a narration during the bus ride to the field site and a full day of instruction for groups of 36-40 students.

Hydrology of Florida and wetland studies are conducted in Everglades National Park. Transportation and narration are also provided.

Within Broward County -

Two **environmental education programs** are provided by MSUS/SEE at John U. Lloyd Beach State Park. The first, begun in 1983, is the **Barrier Island Field Study** for 4 through 12 grade levels. The second program is a similar study, but in conjunction with a **SCIENCEMOBILE**, a mobile laboratory unit.

The most recently added MSUS/SEE program (Spring 1986) is the Barrier Island Study which was extended to include early childhood, or kindergarten through 3rd grade. Since there are very few structured outdoor field experiences designed specifically for early childhood development, this environmental education program is becoming one of the most popular of the one-day programs. In general, it emphasizes awareness, involving the senses and teaches about such things as color, texture, temperature, shapes and aroma in nature. This in-county beach park also serves as an early "training ground" so children can learn proper and safe behavior during outdoor field studies.

MSUS/SEE instructors utilize the barrier island with its beach, dune, hardwood hammock and mangrove habitats. These field studies include beach analysis, a barrier island transect, a hardwood hammock hike with identification of native and invading exotic species, and a hands-on series of process oriented investigations at the SCIENCEMOBILE.

Each of the MSUS/SEE programs correlates with many curriculum objectives as outlined in the school districts' science curriculum as well as the **Student Performance Standards of Excellence For Florida**. Certain MSUS/SEE programs provide suggested classroom activities prior to the field study as well as detailed suggestions for follow-up investigations and learning/comprehension evaluation. Because of the sequential nature of the programs, MSUS/SEE often instructs the same students in different programs and is in a position to assess the assimilation of learning. As a result of our hands-on approach, students get personally involved and then really begin to understand the interrelationship and interdependence of plant and animal life in the biosphere. Our instructional strategies involve the individual student in first-hand observation as well as the collection, measurement and analysis of data, and conclusion formation. All of this leads to an enthusiastic, personal involvement of the individual with his/her South Florida environment.

The materials which are needed for the investigation are supplied by MSUS/SEE either by direct purchase, direct construction or supplied by the school district in a cooperative effort.

EFFECTIVENESS

After every program, our field instructors present the visiting teachers and chaperones with evaluation forms with which they may criticize various aspects of the program. A self-addressed envelope is also presented so that the completed evaluation may be sent directly to the MSUS/SEE office. These evaluations are then read and acted upon by our staff. An overwhelming favorable response is expressed in the returns.

The continued growth of the total number of student days within our MSUS/SEE programs is another indicator of this program's success. Teachers enthusiastically return with their classes year after year as they anticipate the benefits of these hands-on experiences.

Request for teacher workshops has increased during this school year as more teachers feel the need to experience our program first-hand so that they are better able to integrate the material directly into their curriculum. The new early childhood program was incorporated at the urging of Broward County School administrators and teachers to meet the needs of a neglected population in environmental education.

IMPLEMENTATION REQUIREMENTS

This particular program is designed around the unique ecosystems of South Florida, however the strategies used in this locale can be incorporated into the systems of any region. The basic curriculum is built around the existing field sites as identified by MSUS/SEE. Arrangements are made to utilize these sites along with the necessary transportation to and from the sites. The individual programs are designed by the MSUS/SEE staff with considerations for the current state adopted curriculum in science and environmental education.

COST REQUIREMENTS

The first financial consideration is one associated with instructor's salaries. Each program has a fee paid by participating students which covers the costs of instructors, transportation, materials, information printing, administration, and program development. Occasionally, a private group will sponsor a class, grade level, or an entire school. The second consideration is one of insurance. MSUS carries an insurance policy which provides coverage for the students and adults involved with our programs. In addition, MSUS is named as co-insured on the policies held by the facilities on which we conduct our programs.

SERVICE AVAILABLE

It is our goal to promote Environmental Education Programs throughout the state. We would welcome the opportunity to share our program with other districts by having representatives from other schools and organizations visit us and participate in our workshops. Through the services of our Environmental Education Consultants, we are able to assist others interested in developing similar programs.

Marine Sciences Under Sails/School of Environmental Education
P.O. Box 3994, Hollywood, Florida 33023. Phone (305) 983-7015
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Life Lab: A Community Based Elementary Science Program

Wendy Feltham

Formerly Assistant Director of Life Lab Science Program, Wendy Feltham is now principal of Lexington Elementary School, Los Gatos, CA.

The Life Lab Science Program works in elementary schools to teach science and nutrition through a garden laboratory. Over sixty California elementary schools now use the program, and every week more schools express an interest in developing their own "living laboratory" for science learning.

Life lab began as one teacher's special project at Green Acres Elementary School in central California in 1979. While the seed that would grow into Life Lab was germinating, researchers at Project Synthesis, a science education research group at the University of Colorado, were developing guidelines for model science programs in the United States. The National Science Teachers Association (NSTA) would later use this study to promote excellence in science teaching.

Welcome to
Life Lab
The Growing Classroom
Our Garden Is A
NATIONAL
GARDEN GRANT
WINNER
WENDY FELTHAM

Life Lab entrance at Green Acres School, Santa Cruz

In 1982, under the leadership of President Robert Yager, the NSTA sponsored a nationwide "Search for Excellence in Science Education," and identified criteria of excellence in elementary school science:

1. Focus on effective consumer behavior;
2. Deal with effective personal health practices;
3. Recognize that people effect the environment and vice-versa, while developing an ethic of custodianship;
4. Provide vehicles for students to experience variation in interpretation of some data;
5. Provide students with experience concerning the hard work involved with resolving problems;
6. Focus on great variety of the dimensions of science;
7. Recognize the "people" involved with scientific pursuits.[1]

Life Lab emerged from this nationwide search as one of six "Centers of Excellence." After concluding a three-day program review of Life Lab at Green Acres School, Dr. Robert Yager wrote:

> In many respects the science program at Green Acres (Grades 3-5) best represents the new directions for elementary school science that were synthesized from current data/indicators by the (Project) Synthesis researchers . . . The Green Acres program is a near-fit model for the Synthesis criteria for an ideal science program . . . The program emphasizes appropriate consumer behavior; it involves students in . . . gathering first hand information. It is designed to make a difference in the daily lives of students. The program visualizes the student as central, as a focus of study. Personal health is emphasized with a goal of affecting habits and quality of life. The program has a strong environ-

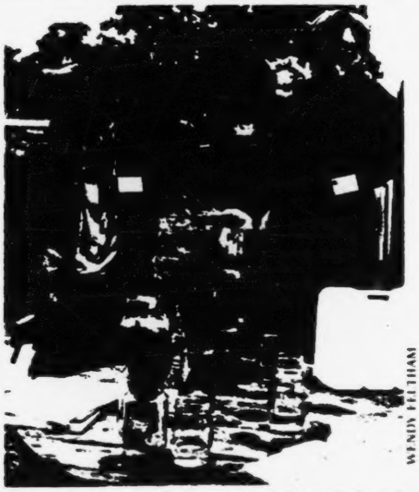
Used by permission of the Life Lab Science Program, A National Diffusion Network Project.

mental component where the interdependence of humans and their environment is central. The emphasis is placed on stewardship and responsible personal behavior and actions.[2]

LIFE LAB GROWS

After it won national recognition, the program began to spread. In 1983, funded by private sector sources, teachers from ten elementary schools in Santa Cruz County attended Life Lab workshops at Green Acres School. Life Lab's three-volume curriculum, *The Growing Classroom*, was published to help teachers with little science background develop a "living laboratory" at their school sites. The laboratory allows students to conduct a variety of science and nutrition experiments and study scientific processes. The teachers used their new training to launch the Life Lab Science Programs at schools with widely different characteristics and needs. The schools were in large and small districts, in downtown Santa Cruz and in isolated coastal and mountain communities. The students differed as much as the schools. For example, primarily Hispanic children from migrant farmworking families attended some schools, and upper-income children attended others.

The year Life Lab began spreading to other schools, it also won recognition from the California School Boards Association, which awarded Life Lab its Golden Bell for being the best elementary science program in the state. The association in giving its awards also noted that one of the program's strengths was its ability to involve the community. The association members were impressed that students from the education and environmental studies departments of the University of California, Santa Cruz, and college students studying alternative energy sources at the local community college had completed internships and work-study programs at Life Lab sites. Special projects included teaching small groups of students in entomology and botany. The college students helped build solar greenhouses and solar cropdryers.


WENDY FELTHAM

Pam Ortiz (Del Paso Heights School, Sacramento) and Roland Hedgepeth (Freedom School, Watsonville) perform an experiment in soil drainage and water reternsion.

A non-profit organization was founded to support the dissemination of Life Lab. The thirteen board members include superintendents of school districts, Life Lab teachers, University representatives, and local farmers. Businesses and community groups have donated time, money, and supplies to each of the Life Lab schools. For example, the Packard Family Foundation donated over $25,000, a nursery gave fruit trees, and men from a social group have worked in groups of 30 to 100 to construct a lathhouse at one school and compost bins at another. Parents have also given expertise and time to a program they say is vital to the education of their children.

Because of such strong and growing support, a visitor to the Green Acres Life Lab may see enthusiastic students transplanting seedlings from the greenhouse, measuring soil temperature, conducting a census of insect predators in a garden plot, testing food for various nutrients, studying the carbon-dioxide exchange of their plants, constructing a solar oven, designing a garden-based experiment, and investigating the decomposition process in their compost pile.

STATEWIDE DISSEMINATION

State legislation was soon to lend support to the blossoming program. Due to the leadership of Assemblyman Sam Farr, the California State Department of Education gave the directors of Life Lab the funds they needed for statewide dissemination to more schools beginning in 1984. Ten sites were selected as Demonstration Model Sites to span the geographic and ethnic diversity of our state. Today Life Lab thrives in urban settings such as Yick Wo School in San Francisco and Open Magnet School in Los Angeles, in rural schools such as Happy Valley Primary School in Shasta County, in suburban schools such as the two schools in Mark West District in Santa Rosa, in large schools such as Rock Creek School (ADA 800) in Auburn, and in small schools such as Pacific School (ADA 45) in Davenport. Teachers at the Demonstration Model Sites have been able to adapt the program to coastal, valley, and mountain settings.

The innovative ideas that founded Life Lab continue to spring forth as Life Lab spreads.

- Cross age Life Lab tutoring by upper grade Gifted and Talented (GATE) students of younger students has been initiated at Del Paso Heights, Sacramento, a new Demonstration Model Site begun in the fall of 1985.

- Pacific School in Davenport and Happy Valley School in the Santa Cruz Mountains, both small, isolated one-school districts with prospering Life Labs, have decided to compare garden and weather data by telecommunications links, using modems attached to classroom computers.

- The students at Mark West District in Santa Rosa earned enough money from their Walkathon to hire a half-time Life Lab coordinator, a member of their community who has a degree in biology and training in botany and gardening.

- Bilingual teachers from Santa Cruz and Watsonville are beginning to develop Life Lab units for teaching English as a Second Language to their language minority students.

- Parent and community organizations have expressed their support for their local Life Labs in many ways. They have built a greenhouse at Rock Creek School in Auburn, served on an advisory board at Hickman School near Modesto, donated

PTA funds at Robert F. Kennedy School in San Jose, and volunteered as garden supervisors at Happy Valley Primary School in Shasta County.

The following table illustrates the possible links between a school and its community in the development of a Life Lab Science Program.

TEACHER WORKSHOPS

The two-day Life Lab teacher-training workshops employ recent findings in educational research. During the sessions the teachers practice among themselves lessons from the text they will eventually teach their students. Professor Wynne Harlen of the University of Liverpool in the United Kingdom reports that teacher training is most effective in science education workshops that

- promote active participation of the teachers so that they *experience* the kind of learning that is being advocated for children, in reflecting, in analysing, in creating;
- allow the handling of materials by teachers so that they gain enough confidence to provide similar experiences for their students;
- encourage reflection on direct experiences through discussion of new ideas.[3]

During the Life Lab workshop, teachers begin to use a garden as a laboratory by analyzing its soil, preparing and planting a bed of vegetables, and using their five senses to explore the creations and processes of nature. Teachers' confidence and satisfaction with teaching science increased dramatically following training in the Life Lab program. A questionnaire was administered to 36 teachers before the two-day Life Lab workshop in March, 1985, and again after three months of program implementation:

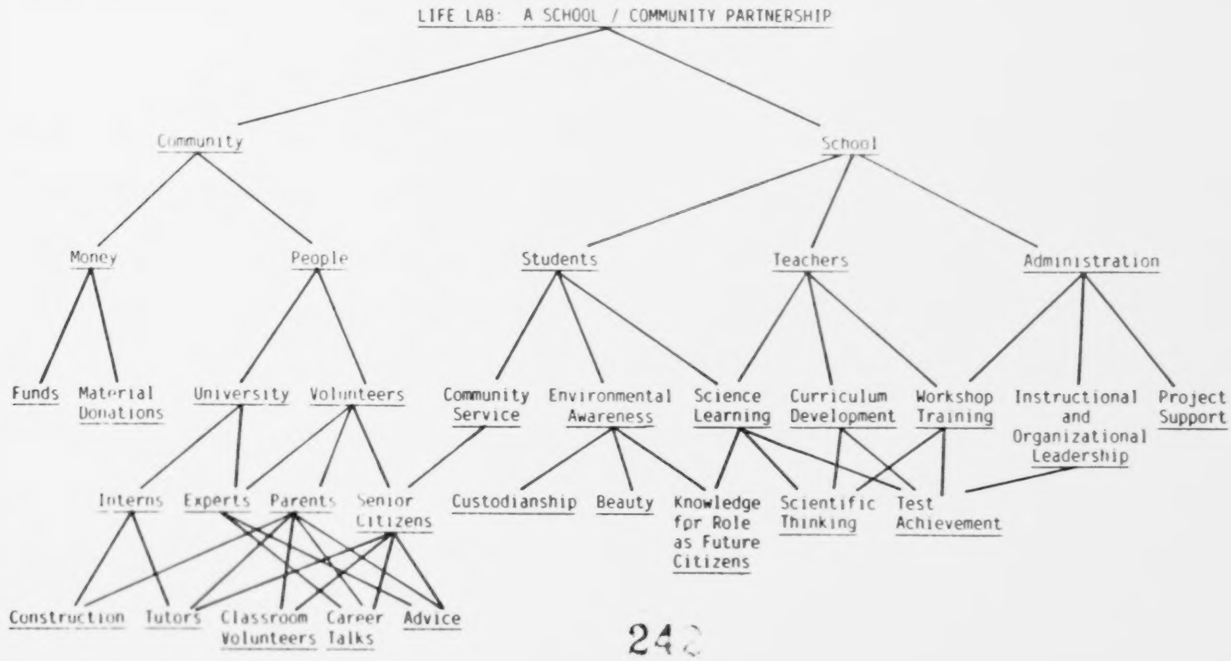
1. I'm satisfied with my science program. pre- 39% post- 79%
2. Teaching science is enjoyable. pre- 72% post- 97%
3. My students enjoy studying science. pre- 72% 97%
4. My students are learning a lot of science. pre- 39% post 67%
5. My students are able to apply what they learn in science class when they are *not* in school. pre- 36% post 67%

In January, 1986, the Life Lab staff initiated the second phase of training for Life Lab instructors. Sponsored for Life Lab teachers in TECC Region 8, "Phase II" is designed to improve teacher effectiveness in using the scientific method, devising experiments, and incorporating local issues of "Science/Technology/Society" education such as pest control or toxic waste disposal. Participants learned of recent developments in science education from lectures by researchers Rodger Bybee of BSCS and John Penick of the University of Iowa.

The three-volume Life Lab curriculum, *The Growing Classroom*, is in a constant state of revision and evolution. Additions are welcome from practicing Life Lab teachers who develop lessons in Life Lab-sponsored curriculum development groups or independently. Since the University of California at Santa Cruz received a grant from the National Science Foundation (NSF) the curriculum is being expanded to include Physical Science, such as Weather, and to further develop areas of Biological Science, such as Ethnobotany and Ecosystems. Under the auspices of the NSF grant, a summer institute will be held at U.C. Santa Cruz for trained Life Lab teachers to develop science curriculum that they will field test in their classes the following year.

LIFE LAB EVALUATION

The appropriateness of Life Lab science instruction for elementary students is undergoing evaluation. In 1985, 515 children in two Life Lab schools and three comparison schools participated in cognitive and affective pre and post-testing to determine the effectiveness of the program for student achievement. Results have not been fully analyzed to date, but Green Acres students showed continual growth in science


LIFE LAB: A SCHOOL / COMMUNITY PARTNERSHIP
Community
School
Money
People
Students
Teachers
Administration
Funds
Material Donations
University
Volunteers
Community Service
Environmental Awareness
Science Learning
Curriculum Development
Workshop Training
Instructional and Organizational Leadership
Project Support
Interns
Experts
Parents
Senior Citizens
Custodianship
Beauty
Knowledge for Role as Future Citizens
Scientific Thinking
Test Achievement
Construction
Tutors
Classroom Volunteers
Career Talks
Advice

achievement at every grade level on the science portion of the standardized Comprehensive Tests of Basic Skills (CTBS). The growth is even more impressive given the socio-economic status of the community. In contrast, the comparison schools showed declining or erratic achievement.

CTBS SCIENCE TEST RESULTS (NATIONAL PERCENTILE)

	GREEN ACRES		CONTROL #1		CONTROL #2	
GRADE 2	pre	post	pre	post	pre	post
GRADE 2	72	94	79	93	84	91
GRADE 3	51	64	70	66	21	54
GRADE 4	80	87	90	85	56	56
GRADE 5	75	83	61	74	48	54

Motivation of Children in Science

Life Lab teachers report that their students not only learn more about science, but that their pride in accomplishment increases their self-esteem. The President of the non-profit Life Lab Science Program, Santa Cruz City Schools Superintendent Dale Kinsley, says that "Initiating Life Lab requires new resources and energies, but results in a more enlivened, meaningful learning experience for students." Principal Bill Van Nort of Rock Creek Elementary in Auburn also believes, "It is meaningful to the students' lives. They are so motivated that we have had no discipline problems. The kids love Life Lab."

Student motivation may be linked to their achievement on standardized science tests. Teachers have noted that after Life Lab instruction, girls have scored as well as boys on science tests. Due to a traditional preponderance of men in science-related fields in the United States, the achievement in science by girls and later equal opportunities for women in science careers is a concern of science educators.

A science achievement and attitude study of American fifth graders by the International Association for the Evaluation of Educational Achievement (IEA) compared responses of nine-year-olds today and in previous years. Professor Steven J. Rakow reports that in 1982, males scored higher than females on all science achievement items with the exception of one, and that boys also reported more positive attitudes than girls toward science and science classes. He noted that:

> In 1977, 59 percent of the students felt that they could help solve (science related) world problems, but by 1982 only 52 percent felt capable of solving these problems. .

Black females also showed the greatest amount of pessimism about their ability to solve world problems.

The Life Lab Science program, unlike traditional science programs, appears to motivate girls. The first affective tests administered to 303 girls as pre and post-tests show an increased interest in science after only three months using the program.

1. My favorite subject in school is science.
   pre - 23% post - 28%
2. Science is easy for me.
   pre- 47% post - 57%
3. If I learn a lot about science, I can make the world better.
   pre- 29% post- 37%

How to Begin A Life Lab Science Program

Does your school have the essential ingredients for establishing a successful Life Lab? If you have a core of enthusiastic teachers, administrative leadership, and strong community involvement, contact the Life Lab staff (Director Gary Appel and Associate Director Lisa Glick) at 908 Bay Avenue, Capitola, CA 95010, tel. (408) 476-7140.

Ask for a packet of information about the program and teacher-training workshops. The curriculum may be purchased for $40. Life Lab staff may arrange for school groups to tour Life Lab sites in Santa Cruz County or they may present a Life Lab slide show to school/community groups.

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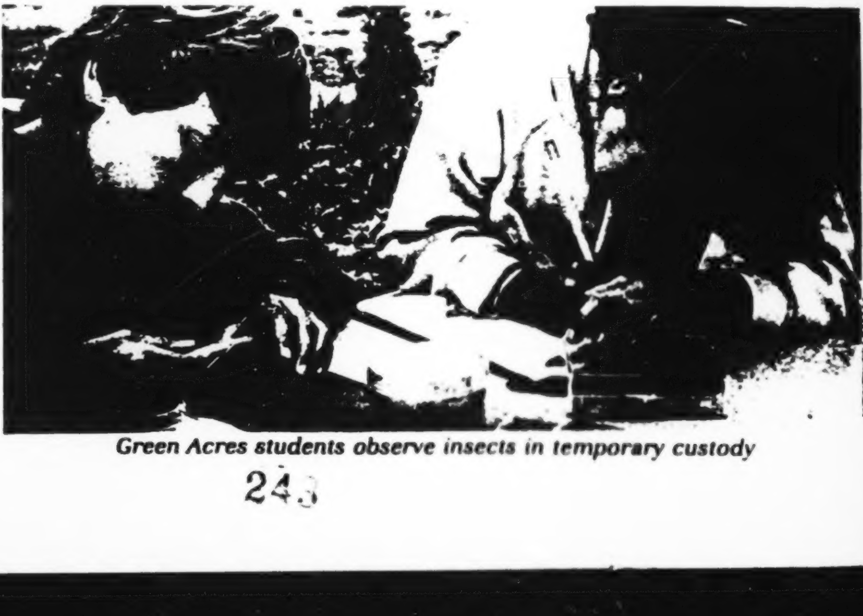

WENDY FLETTMAM

Green Acres students observe insects in temporary custody

The Pocono Environmental Education Center
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The Pocono Environmental Education Center (PEEC) has functioned as a regional center for environmental studies since 1972. PEEC grew from a residential center with four persons on staff who served 2,000 visitors in 1972 to a current staff of twenty-five people who served 20,000 visitors last year. Hence, PEEC has the distinction of being the largest residential center for environmental studies in the Western Hemisphere.

In addition to providing a full range of environmental study programs for approximately 13,000 adolescents each year, PEEC also provides programs for teachers, science supervisory personnel, administrators, and nonformal educators via science leadership seminars, science and field natural history workshops, and in-service training workshops.

PEEC programs that extend individuals experience and ensure lifelong learning include Elderhostel programs, Family Camps, photography and natural history weekends, and Conservation Camps.

FACILITIES

PEEC is located on the eastern escarpment of the Pocono Mountain Plateau overlooking the Delaware River Valley. It is an ideal site for studying nature. In addition to the state and federal wilderness areas near the center, there are over 40 natural areas proximal to PEEC which serve visitors as outdoor laboratories and study sites. These areas include acid bogs, hemlock ravines, xeric cliffs, scrub oak barrens, cultivated fields, and diverse aquatic habitats such as reservoirs, ponds, upland lakes, and streams.

PEEC program facilities consist of field stations and equipment for ecological investigations, meteorological observations, computer interfacing, orienteering, and action socialization activities; a main lodge with meeting space, darkroom, computer lab, and natural history reference library; a bookstore and 12 miles of interpretive trails. The campus includes 45 heated cottages with over 350 beds, a dining hall with seating for 200, several recreational sites and equipment for canoeing and cross-country skiing, a bus for field trips to areas of ecological significance, and a solar heated demonstration cabin.

PROGRAM

At PEEC the primary focus is study of the environment. This focus is an inter-disciplinary process which can be adapted to diverse age groups, ability levels, or academic interests. In the student booklet outlining their

PEEC experience, visitors from the Pearl R. Miller School in Kinnelon, New Jersey write:

> Being a cultural animal, man is dependent upon education for guidance in dealing with his cultural and natural environment. The confinement of the classroom does not always allow the student to become involved in all aspects of the learning situation. By participating in this environmental education trip, the students will realize that their environment is not made up of separate parts — the world of plants and animals, the world of social interactions, the world of language arts, or the world of technology. Rather, it is desired that the students perceive that these processes flow through the total environment; in so doing, they will become totally and personally involved in the whole process and will be better prepared to deal favorably with their total environment in the future.

This school's goal was to extend instruction beyond that which could be gained in the classroom. They were among the more than 300 groups which experienced PEEC programs last year and subscribed to PEEC goals that include:

Awareness: To help people acquire a strong feeling of concern for the environment and the motivation for actively participating in its protection and improvement.

Knowledge: To help people acquire a basic understanding of the total environment, its associated problems and humanity's critically responsible presence and role in it.

Attitude: To help people acquire social values and the ability to make sound choices while developing a sensitivity to the environment.

Skills: To help people acquire the skills for solving environmental problems.

Evaluation: To help people evaluate environmental measures and instructional programs in terms of ecological, political, economic, social, and educational factors.

Participation: To help people move toward taking the necessary action to provide for a healthful and healing environment.

The integration of the natural sciences with the humanities, arts, and social sciences has proven to be an exceptionally impressive experience for visitors to PEEC. Among instructional programs offered are:

Outdoor Science Lessons — instructional strategies in outdoor biology, including pond and stream studies.

Wildlife Study — field investigations into animal populations and demonstrations of wildlife as a valuable natural resource.

Forest Study — discussion of habitats, succession, competition, tree identification, and biotic and abiotic factors which control growth.

Weather Wall — basic meteorology utilizing professional weather instruments and observation techniques.

Fossil Walk — geological inquiry into fossils, sedimentation, erosion and land uplift processes.

The instructional program at PEEC accommodates for diverse learning styles and is focused on four modes of learning:

Concrete experiencing — actually doing something, being directly involved with objects in a situation.

Reflective observing — looking at an experience and thinking about it.

Abstract concept making — forming hypotheses on why an event happened as it did.

Active experimenting — testing hypotheses by developing a plan and carrying it into action.

For school students, instructional sessions at PEEC complement classroom work. Instruction is enriched through stressing multi-sensory science activities in addition to those that the teachers provide in their classrooms. Cognitive information is presented by PEEC instructional personnel via multi-sensory science lessons.

Instructional sessions at PEEC emphasize hands on experience. Classes are generally held for six (6) hours per day, with special lectures, demonstrations, and such activities as night hikes held in the evening. Class size ranges from 10 to 20 students. Small group instruction is optimal for the out of door and activity oriented lessons characteristic of PEEC.

Through the combined efforts of dedicated teachers and the PEEC instructional staff, students come away from their PEEC experiences with an enlightened sense of their own abilities. They gain a more concrete understanding of ecological processes through direct experiences with and in nature. They also get an inkling of the directions and decisions they need to pursue toward a career or commitment to environmental improvement.

SPECIAL EVENTS

In addition to programs for groups of students who range from early childhood through college level, PEEC is nationally recognized as a regional center for teacher training workshops. These PEEC meetings provide an opportunity for educators to experience, examine, and evaluate outdoor science curriculum materials and practices. Educators are also introduced to the top theorists, curriculum developers, authors, and practitioners in the field while working with fellow educators from throughout the region.

The center has an extensive history of planning and implementing conferences for science supervisors, administrators, formal and non-formal educators, school board members, and other educational decision makers. Topics include learning styles, computer interfacing, computer graphics, urban education, acid rain and energy education. These gatherings have brought together national leaders in science education, and have resulted in the dissemination of curricula and materials focused on science and society. Co-sponsors of these workshops and professional organizations with whom PEEC networks include: National Science Foundation, National Science Supervisors Association, Conservation Education Association, American Nature Study Society, Alliance for Environmental Education, Association of Interpretive Naturalists, American Institute of Architects, National Science Teachers Association, and many other regional organizations involved in science education and the environment.

Other workshops and special weekends are geared for the general public. Again, the emphasis is on hands-on participation and experience. Birding weekends, such as the popular Warbler Weekend in the spring and Hawk Watch Weekends in the fall, are designed for both amateurs and seasoned professionals. So too are PEEC's other natural history workshops, photography seminars and Elderhostel programs.

Elderhostel programs, offered three times each year, extend the learning experiences of longer-living citizens to include unusual adventure activities such as bog explorations, wildlife population surveys, and cross-country skiing.

For families, PEEC provides nature education through holiday weekends and week long camps. These programs are priced to be affordable for families of all ages and sizes and are led by PEEC program staff. They include wildlife investigations, camp craft skills, canoeing, and cross-country skiing.

TYPES OF GROUPS

Approximately 300 non-profit organizations visited PEEC last year. School groups comprise 70% of this total. Groups that visit PEEC include early childhood, elementary, middle/junior and senior high schools, and college level classes. The elementary through middle/junior high school range comprises almost 90% of this category, from mentally and physically disabled through academically gifted.

Non-formal education groups whose members have experienced PEEC include youth organizations (e.g., Boy Scouts, Girl Scouts, 4-H Clubs, Future Farmers of America, Indian Guides and Princesses), church groups, neighborhood associations, cultural organizations, adult special interest groups, and nature clubs. These visitors have PEEC experiences that contribute to their lifelong learning.

Examples of organizations returning frequently to PEEC are: United Nations International School, New York City's Project LEAD, the New Jersey Sierra Club, the Montclair State College Institute for the Advancement of Philosophy for Children, regional Audubon clubs, Roy H. Mann Intermediate School #78's Career Education classes, and Lehigh University's Engineering Department.

PEEC HISTORY

Originally a honeymoon resort, PEEC came into existence through the combined efforts of the National Park Service, Keystone Junior College, and the Army Corps of Engineers. The Park Service invited Keystone Junior College to apply for a 10-year special permit to convert the resort into a science education center. In 1982, PEEC's special use permit was renewed for an additional five years. Currently, the center is moving towards incorporation on its own non-profit status.

The center is self-sufficient and generates its operating income through visitor use fees. Exception to this has been support from the National Science Foundation for exemplary programs (viz. Outdoor Science Education Workshops), a Special Needs Workshop, National Science Supervisors Association Leadership Workshops, and contributions from co-sponsors of in-service workshops. This support represents less than one percent of the center's operating income. The center also has a membership program to assist in raising funds for improving facilities and programs.

CONCLUSION

From evaluations, comments from visitors, and an annual return of 85% of visitors to the center, it is obvious that the PEEC experience is positive. The action-oriented activities leave visitors with a sense of excitement, confidence, and wonder at themselves and the world around them. The many program options involve individuals in the discovery process thus making each activity an adventure in itself. The structured lessons (modeled on nationally tested and recognized science curricula) provide visitors with a strong sense of the scientific process and a clear understanding of ecological concepts. A sense of community is also fostered through the residential living experience. It is the sum of all of these parts that make up the total PEEC experience.

Appendixes

Clean Water, Streams and Fish

Published in two parts by the Office of the Superintendent of Public Instruction,
State Fisheries Department and Municipality of Metropolitan Seattle.
For copies write to:
Tony Angell
Supervisor, Environmental Education
17011 Meridian Ave. N.
Seattle, Washington 98133
(206)542-7671
Cost: $7 per guide; $14 per set

Just as the nation's energy "crisis" of the mid-70s generated the curriculum **Energy, Food and You**, regional concerns over the destruction of watersheds and a decline in populations of salmon fostered the support and momentum leading to the writing of the curriculum **Clean Water, Streams and Fish.**

Washington State, along its relatively protected marine system known as Puget Sound has nearly a dozen major rivers and hundreds of smaller streams and creeks that drain directly into its waters. Within these waters five species of native salmon live and there exists an extraordinary opportunity to study the conditions that affect their existence. It seemed only natural, with the existence of a fine educational program in British Columbia to the north, that Washington would develop a similar program to fit its needs in environmental education.

As in the case of **Energy, Food and You**, a series of classes were conducted for teachers which provided the information and skill base necessary to go ahead with both the writing of the guides and the application of the curriculum contents. Every effort was made to include the personnel from agencies having some responsibility in the water quality or fisheries field. Their contributions were critical to the success of the program as were those of the teacher writers many of whom had field experience in working with classes on water quality studies.

In one sense it might be said that the inservicing component evolved with the writing of the curriculum guides. While portions of the guide were being used by the teachers being trained, the completed guides were assembled as the contents were being tested.

The curriculum guides (elementary and secondary) are both organized into chapter sections that move from the general biological characteristics of salmonids and the habitats within which they thrive to conditions threatening their welfare and the solutions to those problems. The secondary guide has a "watersheds" chapter where special attention is given this subject. The matters of threats and solutions to problems is discussed in the chapter entitled "Issues." In this section some of the more regional matters are discussed including the Federal Court decisions and tribal treaties affecting the fishing rights of both the native and non-native commercial fisheries.

The elementary guide includes a suggested one-week lesson with an interdisciplinary emphasis on water quality and basic biology of fish. There is also included a list of all lessons by subject area so, as in **Energy, Food and You**, the teacher may choose lessons from the curriculum that will have a discipline emphasis in science, social studies, math or language arts. Likewise, there is a listing of the major concepts developed in the guide so the user may choose to emphasize some particular aspect of the ecology of the fresh and salt water system or a principle of biology. All of these concepts are framed against the larger "environment" within which the fish and the human community functions. An appendix in the elementary guide includes a glossary relative to salmon and clean water subjects as well as useful reference material that falls outside of that material included with each lesson. The secondary guide includes a set of study questions that may be employed to measure student learning in the process of instruction.

As in other curriculum developed by this office, the success of the program has in part been the result of an on-going inservice program. The fact that we continue to revise, reprint and distribute these materials on the basis of an ever increasing demand suggests the importance of such resources regionally. We have also distributed copies, upon request, to all of the Pacific states as well as Idaho and Montana. The basic information dealing with biology, habitat, threats and solutions would serve any state program in environmental education where migratory salmonids were an important part of the local environment and economy as well as an indicator of environmental quality.

Like **Energy, Food and You**, the **Clean Water, Streams and Fish** has built into it a "field experience" emphasis. This seems to be one of its primary strengths as it has not only the classroom instructional strategies, but is also directed toward getting the kids involved outside the classroom and in many cases directly in the local watersheds and streams. Several of the schools using the curriculum (districts have actually adopted it as their science programs at the secondary level) routinely involve the students in field surveys using the inventory. Fish rearing tanks are now a part of several classrooms at both the elementary and secondary level and the students play an active role in the rearing of the fish, the study of their environment requirements and their eventual release into the local streams. At the high school level actual egg rearing boxes are in place on streams and fish returns (sockeye salmon) have been achieved.

Written and developed by: Office of Environmental Education, N.W. Section, Superintendent of Public Instruction. Tony Angell, Program Supervisor; Claire Dyckman, Coordinator. Reprinted by permission.

Energy, Food and You

Two-part (elementary and secondary) guide published by the Office of the Superintendent
of Public Instruction through the Office of Environmental Education, Northwest Section.
For copies write:
Tony Angell, Supervisor, Environmental Education
17011 Meridian Ave. N., Seattle, Washington 98133
(206) 542-7671
Cost: $7 per guide; $14 per set

In the early 1970s environmental education evolved away from its origins in programs of outdoor and conservation education and began exploring separately the legitimate base of its subject matter. To be sure, Earth Day and the emerging realities of finite energy resources speeded up the process.

Originally, it was intended that the program would operate an energy efficient model farm and students from throughout Washington would visit the site to witness and participate in a variety of projects that demonstrated "efficiency" in the use of energy to produce food energy. We described the uses of methane digesters in connection with the farm stock, the composting of vegetable waste, biological pest control, fertilizing with stock manure, crop production for markets close at hand, recycling systems and the like. Even the proposed structures would reflect the sensitivity to energy conservation with passive and active solar heating, energy conserving construction and the possible use of wood heating throughout the buildings.

While the theory was fine, the practice was not immediately practical. We found initial difficulty in motivating county politicians (times have not changed much) that the highest and best use of farm land now up for sale might in fact be farm land that was producing not only a crop but an educational experience as well. We shifted gears and rather than putting all our eggs in the farm basket, we considered taking the eggs to the schools via a curriculum guide which would include activities that did not require the attendance at a farm site but could still be fresh, engaging and instructive on matters of energy. We also felt that the school itself might become a "site" for student experiments in the efficient use of energy.

In the years following the initial writing and revision of the curriculum guides, an increasing emphasis was placed on the field instruction. Once the teachers had been instructed locally and were effectively using the guides for classroom instruction, many of these same teachers returned for instruction in the knowledge and skills necessary for becoming instructors themselves. This team of instructors could then move back to their respective districts and become the coordinators of the program in their immediate community. They, in effect, became the multipliers.

One of the key elements to the success of the program, apart from the spirited and creative coordinator, was the format of the curriculum itself. A simple and direct format was selected for "getting into" the activities. For example: the secondary guide is organized into four sections ranging from global resource issues and characteristics of energy to energy and its role in the U.S. food system and efficient nutrition. The teacher has the opportunity to survey the range of concepts and then select the one most compatible with a particular emphasis in his or her curriculum. The variety of activities to choose from allows the teacher to select the best strategies for reaching their particular student population.

In addition to the above, there is a separate alphabetical listing of all activities, charts and graphs. Here again, the teacher will find that this serves as a convenient means to survey what's available. He or she may wish to take such tables and graphs and use them independently of the activity and this listing gives immediate access. Every attempt has been made to include only the most up-to-date and objective information when selecting or constructing these graphs and tables. Teacher success with these materials supports the belief that the basis for the information is quite accurate.

A final bibliography is a compliment to the effort that has been made to make each activity as complete as possible. In other words, a teacher does not require additional resources to teach an activity. Should additional resources be desired, the teacher can order them from the addresses included with many of the citations.

A final note should be made regarding the "Teacher Comments" section that often follows each activity. The guides have included the remarks of the teachers who have used the activities and have shared their unique insights and evaluations. A teacher has but to refer to these "comments" to get a first-hand feeling as to how the activity actually works and what strategies might best be applied to get the most out of it.

The Energy, Food and You curriculum has been disseminated throughout the United States, with specific uses of the guide being applied in Great Britain, Scotland, Canada, India, Japan and Mexico. Without question, the ease with which it approaches fundamental questions regarding energy use and conservation has been an important ingredient in its success. Revised and reprinted continuously since its development, there is no question that the Washington State Office of Environmental Education will continue to make this important curriculum available.

Written and developed by: Office of Environmental Education, N.W. Section, Superintendent of Public Instruction. Tony Angell, Program Supervisor; Chris Peterson, Coordinator. Reprinted by permission.

Conservation for Children

A National Diffusion Network program funded by the U.S. Department of Education.

Program materials are designed to increase awareness, understanding and action of elementary schcol children. The program provides an opportunity for all students to gain knowledge in conserving natural resources and energy that will aid them in planning and caring for our environment.

Materials include six grade level guides and one All Levels (activities/resource) guide which integrate conservation knowledge with practice in the basic skills. Student worksheets are intended for use in the classroom and require no additional time, equipment, or materials.

Organization and Materials

Six grade level conservation guides and one "all levels" guide provide student worksheets designed to be duplicated by the teacher. Each grade level guide contains 90 pages of student worksheets (40 in language arts, 20 in math, 20 in social studies and science and 10 in related activities such as art and music). Also included in each guide are directions for usage, correlation tables to link basic skills with conservation topics, criterion referenced tests, and a class record sheet for tabulation of student need areas. In addition, the "all levels" guide includes ideas for art, music, classroom growing activities, referenced lists of films, field trips, other conservation programs, free materials and books.

The content of the student worksheets has been field tested to assure that 1) conservation topics are relevant to student interests and appropriate for their grade level, 2) basic skill areas are consistent with accepted grade level objectives, and 3) student ability levels are diverse.

Although the conservation topics are sequenced, grades 1 through 6, it is not necessary to use guide 1 before guide 2, etc. The conservation guides can be used as a complete instructional program or as individual grade level materials.

Classroom Activities

Project materials are very flexible and can be used with any instructional methodology. The materials have been designed to be used in the classroom and have proven appropriate for self-contained classrooms as well as open space facilities. Teachers may use the materials as individual student assignments, group projects, or unit teaching. They are applicable as a primary resource for teaching basic skills, as supplementary materials to a core program, for enrichment activities, skill review, or for unit study. Teachers already using 'hands on' programs such as "Green Box," "Project Learning Tree," etc., will find these materials valuable for reinforcement and follow up.

Implementation Requirements/Provisions

Implementation requirements include an awareness/inservice presentation and acquisition of the materials. No additional instructional time, space or personnel is required.

Cost of the program:

Each grade level guide (1-6)	$25.00
All Levels guide	$25.00
Complete program (7 guides)	$165.00

On-site training available, costs and travel expenses to be negotiated.

Time Line

1. Awareness/inservice - after school or minimum day (1)
2. Acquisition of materials
3. Classroom implementation

Visitation Opportunities

Visitation opportunities are available in the Cupertino Union School District. Please call the contact person listed below for an appointment.

Contact Person

Marilyn Bodourian, Project Director
John Muir Elementary School
6560 Hanover Drive
San Jose, CA 95129
Program Office: 408 725-8376
School: 408 252-5265

Conservation for Children, an NDN Program. Cupertino Union School District, San Jose, CA.

Missouri Department of Conservation
Outdoor Skills Education Programs
and
Conservation Education Programs

The Outdoor Skills Education Program at the Missouri Department of Conservation grew from an already successful hunter education program that was established in 1958. In 1977, the hunter education program was expanded to include other outdoor skills that involved using the state's fish, forest and wildlife resources.

The goal of MDC's Outdoor Skills Education Program is to educate citizens in the wise, safe and ethical use of natural resources to help them develop a lifestyle that is necessary to maintain these resources in the future.

The Outdoor Skills Education Program is targeted primarily at junior high and high school youth, although some materials are more appropriate for elementary students and some for adult groups. All curriculum materials are interdisciplinary to allow a teacher to teach outdoor education in physical education, history, social studies, science, home economics, geography, fine arts, language arts, mathematics, reading or even industrial arts.

The materials developed for outdoor skills education are instructor manuals called modules. Each is a self-contained unit that can be used separately or combined with other modules. Each module contains the information necessary to teach the subject including ethics and safety, detailed lesson plans, a glossary and bibliography, and appendixes that can be reproduced as student handouts. Objectives are written for each subject and a suggested examination is included to test students on the objectives.

The value of the modules is their flexibility to be used for a brief or extended period of time, their ability to be used separately or combined and their detailed methods of how to teach outdoor skills in a variety of situations (classrooms, camps, youth groups and clubs).

The modules have been divided into series as follows. (An asterisk indicates those modules that are available.)

Outdoor Living Skills: Basic Principles*, Environmental Emergency Preparedness, Backpacking*, Backpack Cookery*, Map and Compass*, Camping, Campground Cookery*, Caving, Outdoor Photography*.

Shooting Skills: Firearms Safety*, Hunter Education* (instructor and student manuals), Basic Rifle, Basic Shotgun & Shotgun Games, Basic Pistol, Black Powder.

Aquatic Education: Casting Equipment*, Basic Fishing*, Fishing Without Rod and Reel, Fly Fishing/Fly Tying, Advanced Fishing, Making & Repairing Fishing Equipment, Basic Canoeing, Water Safety and Survival.

Archery Skills: Basic Archery*, Bowhunting, Bowfishing.

Primitive Skills: Trapper Education*, Historic Crafts and Skills*.

Special Groups: Outdoor Skills for Special Populations, S.P.O.R.T. (Outdoor Ethics)*.

Materials are distributed free to Missouri teachers and youth leaders. Out-of-state individuals can purchase the instructor manuals for $4 each, which includes postage and handling. Orders going out-of-state could be limited depending upon the quantity requested.

The Conservation Education Programs available on a cost-recovery basis include:

Conservation Seeds (Early Childhood Program)
"Conservation Seeds" is a planting program, but not the usual kind. The "seeds" are ideas to be planted in the most fertile medium of all – the minds of young children. "Conservation Seeds" is a comprehensive conservation awareness program designed for three-to-five year olds. Its purpose is to help early childhood teachers heighten children's awareness of nature and conservation.

The "Conservation Seeds" program packet includes a 200-page activity book, four seasonal posters, and animal and habitat cards. Only preschool and kindergarten teachers are eligible to participate in this program.

Learning With Otis (Grades 1-6)
Here comes Otis! Teachers and students in grades 1-6 will meet a conservation friend as they learn with Otis. The "Learning With Otis" program is designed to provide teachers with practical conservation education activities which can be incorporated into the existing curriculum on a regular basis.

Each teacher enrolled in this program receives a teacher's activity book, posters, and classroom quantities of **Notes from Otis**, a conservation education newapaper. Teachers and students receive four issues of the newspaper during the school year.

Conservation Education Series (Grades 7-12)
The "Conservation Education Series" consists of a series of instructional units designed to aid teachers in their efforts to integrate conservation concepts into appropriate junior and senior high curricular areas. Each unit makes conservation concepts more relevant to the students by emphasizing Missouri's resources.

Each instructional unit provides background information, lesson plans, quizzes, and line art for overhead transparencies. The following instructional units are currently available: **A Glossary of Selected Terms of Conservation, Ecology and Resource Use; An Ecological Approach to Conservation Education; Biography of Missouri; Ecology of Missouri Forests; Missouri Deer Game; Soil Formation and Distribution in Missouri.**

For more information write: Missouri Department of Conservation, Conservation Education Unit of Outdoor Skills Education, PO Box 180, Jefferson City, MO 65102

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Section, Jefferson City, MO.**

OBIS
Outdoor Biology Instructional Strategies

Are you looking for something to supplement your basic classroom science program? Are you looking for activities from which the youngsters can learn more about the environment in which they live? Are you looking for activity modules from which you can develop or enhance your own environmental education program? OBIS can fit your needs also!

OBIS Uses the Discovery Approach

Outdoor Biology Instructional Strategies (OBIS) is a program with a variety of outdoor activities for youngsters to enjoy. While engaged in these activities, the youngsters learn more about the environment in which they live. OBIS activities emphasize interactions of organisms with each other and with their environments, including interactions of people with the environment. Learners involved in OBIS activities are active participants rather than passive recipients of someone else's information; participants interact with organisms and environments. In addition, a variety of strategies are used in OBIS activities, such as games, simulations, craft activities, role playing, experiments, and data analysis.

Who Uses OBIS?

These activities are designed for use with youngsters 10 to 15 years of age. However, both younger and older participants, including families, enjoy participating in OBIS activities. Community groups use OBIS activities in their programs. Schools use OBIS as a supplement to classroom activities, outdoor education programs, and environmental awareness projects.

What is OBIS?

OBIS is an outdoor program that offers young people fun and challenging opportunities to investigate ecological relationships in their local environment. The 97 OBIS activities, which take youngsters **outdoors** to investigate biology and to increase their environmental awareness, can be used together or individually. The activities are available from Delta Education in modules or individually.

When Can You Do OBIS?

OBIS activities can be done almost any time. There are activities for daytime and nighttime; rain or shine; sleet or snow; and winter, spring, summer or fall. Do the activities on a one-time basis, once a month, once a week, every day for a week or two, or whenever you can. Do the activities in class, after school, or on a weekend outing. In other words, almost "any time is the right time."

Where Can You Do OBIS?

OBIS activities can be used wherever you happen you find yourself: schoolyards, backyards, street parkways, vacant lots, streams, ponds, lakes, rocky or sandy beaches. Some activities can be used in any type of site, while others are designed for specific sites. Areas that support heavy human use are actually preferred to untouched, pristine environments.

Why OBIS?

OBIS wants to stimulate curiosity in youngsters about life and the world around them. In order for youngsters to become aware of the environment in which they live, they need to participate in thought-provoking activities. Ten- to fifteen-year old youngsters are not satisfied with the "sniff and appreciate" approach to ecological understanding. Instead, OBIS encourages youngsters to investigate the interrelationships of plants, animals, and the physical environment, including the role of humans in the natural scheme. Youngsters not only develop observational skills that they can use throughout their lives, but also gain some understanding about their environment. In order for people to make intelligent decisions about their future environment, they must have knowledge of the one in which they live. Firsthand experience in the outdoors forms a basis for understanding biological relationships. This understanding is necessary to raise the public consciousness required to support appropriate management of the environment.

How Can You Lead an OBIS Activity?

OBIS activities are easy to lead, easy to prepare, and require mostly simple or homemade equipment. The publisher, Delta Education, offers a complete stock of OBIS equipment. (For equipment order forms, call or write Delta Education.) No previous experience with science is necessary! And any biological information necessary to lead an activity is presented in the folio.

The activities in the OBIS modules may be done independently, in a sequence, or as a lead-in to or culmination of other activities. Most activities take a little less than an hour, but many are open-ended. Decisions about the sequencing of activities and amount of time spent are left to the OBIS activity leader. Group size in OBIS activities can vary tremendously. Any specific group or time requirements are indicated in the folio. However, most activities are suitable for both large and small groups.

The Biology of OBIS

Most of you have probably experienced the thrill of lifting up a log or an old board and discovering a myriad of organisms living underneath. Spiders, worms, sow bugs, crickets, salamanders, and fungi are some of the organisms that often form under-the-log communities. How are these organisms able to survive in this environment? What structural or behavioral adaptations enable them to exist under these special conditions? What might the community under the log have to do with us? These are the kinds of biology questions you will find in OBIS activities. Along with such questions, OBIS provides investigative tools for the youngsters to use in finding possible answers.

The OBIS challenge is to help children understand some of the interactions between animals, plants, and the non-living environment. To meet this challenge, OBIS uses the outdoor site as the laboratory in which youngsters have the opportunity to learn. We believe that youngsters gain more understanding by investigating biological events where they naturally occur—in the outdoors.

What is Available?

There are 97 OBIS activities that have been revised for commercial publication. These activities have now been organized into modules that are formed around habitats, biological concepts, techniques of investigation, group size, age of participants, and other such criteria. The activity folios have an easy-to-follow format and are written for the teacher or group leader. Where necessary, some folios contain additional information cards. These cards may provide additional technical information for the teacher, describe how to make a piece of equipment, or present challenges for the youngsters to pursue on their own or in small groups.

This design allows you to select those modules or activities best suited to your needs. A complete list of the modules and their component activities is provided here for your review and consideration. Following the module breakdown, the activities are listed alphabetically with brief descriptions. Select those activities you wish to use as a part of your science, outdoor, or environmental education program.

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Inc., Nashua, NH.**

Project Adventure, Inc.

Project Adventure, Inc., is a national educational corporation with headquarters in Hamilton, Massachusetts, and an office in Atlanta, Georgia. Project Adventure, Inc., grew out of the success of an innovative curriculum development program begun in 1971 in the Hamilton-Wenham Regional High School. The original Project Adventure created a year-long physical education curriculum and a series of interdisciplinary and experiential curricula. This program, based in part on the principles of Outward Bound, created within schools a new way to challenge and motivate students.

In 1974, Project Adventure was chosen as a National Model Program by the U.S. Office of Education on the basis of superior evaluation results and educational significance. Repeated evaluations have demonstrated improved self-esteem, enhanced group cooperation, improvement of school climate, mutual trust, and an increased motivation to learn.

The Project Adventure concept is now nationally known with over 800 formally adopting institutions, with programs in all the States, Canada, Australia and many European countries. Adopting institutions include public and private schools, colleges, counseling centers, hospitals, YM & YMCA centers and summer camps. Since 1974, over 5,000 professionals have been trained by Project Adventure staff and Project Adventure Certified Trainers. Well over a million students have participated in a P.A. course. In addition, the widespread circulation of the basic P.A. text, **Cows' Tails and Cobras** (over 35,000 to date), has resulted in many more informal programs. "Project Adventure" has become a generic term to describe an experiential learning program using a Challenge Ropes Course, initiative problems, and a philosophy of group cooperation and individual challenge.

The Challenge Ropes Course—Project Adventure Inc. programming utilized the Challenge Ropes Course as a tool—a catalyst for personal and educational growth. The course is a blend of low and high activities (presented in a prescribed sequence) designed to take individuals and groups beyond their own expectations, or perceived willingness to try. Data spanning many years has shown that persons who go beyond these self-imposed boundaries become stronger from the effort, in terms of self-confidence and self-awareness.

In all Project Adventure activities, participants are engaging in a "Challenge by Choice," and there is no coercion involved. What is hoped for is a reasonable willingness to try, and the actual mastering of a particular feat is not as important as the attempt itself. It is through a series of these attempts that groups become teams, strangers become supporters and friends, and the individual comes face to face with him or herself. The Challenge Ropes Course facilitates this growth and learning experience.

Project Adventure National Trainers

We are most fortunate to have a network of over 35 truly fine professionals represent Project Adventure in various parts of the country. Our Certified Trainers—teachers, college professors, counselors, outdoor leaders—are highly qualified, thoroughly P.A.-trained individuals who have been teaching our programs at their respective institutions for many years. During spring and summer of 1987, several Trainers will be offering, in conjunction with our national office, workshops in Adventure Programming, Advanced Skills and Standards, and Adventure-Based Counseling. These workshops are similar in content to the courses conducted by both our Hamilton, MA, and Atlanta, GA staff.

You simply cannot go wrong with any one of these choices!

Project Adventure's Mission

Project Adventure, Inc. is an approach to education, counseling, recreation, and life that is engaging, active, challenging, and places a high level of expectation within an atmosphere of support and caring. The impact of the approach is strongly felt within a group, where cohesion and cooperation are often achieved with surprising dispatch. Even more profound is the effect upon the individual, who develop clearer insights and a fuller appreciation of self.

Project Adventure, Inc. is a center for the full support of persons wishing to integrate the following learning goals into their institutional setting:
- To increase an individual's sense of confidence and self-esteem.
- To increase mutual support within a group.
- To develop abilities that contribute to group decision-making and leadership.
- To increase agility, physical coordination and joy in one's physical self.
- To foster appreciation and respect for differences existing within the group.
- To develop an increased familiarity and identification with the natural world.
- To develop an appreciation of the interdisciplinary nature of real problem solving.

National Headquarters: Mailing Address: Project Adventure, Inc., P.O. Box 160, Hamilton, MA 01936, (617) 468-7981; **Shipping:** Project Adventure, Inc., Grapevine Rd. & Route 22, Wenham, MA 01984,(617) 468-7204.

Headquarters: Southern: Mailing Address; Project Adventure, Inc., P.O. Box 6548, Atlanta GA 30315, (404) 622-1360; **Shipping:** Project Adventure, Inc., 1864 Lakewood Avenue, S.E., Atlanta, GA 30315, (404) 622-1360.

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Project Learning Tree

What's in Project Learning Tree?

- **Project Learning Tree** is an award-winning environmental education program designed for teachers and other educators working with students in kindergarten through grade 12.
- PLT uses the forest as a "window" into the natural world, helping young people gain an awareness and knowledge of the world around them, as well as their place within it.
- PLT is a source of interdisciplinary instructional activities and provides workshops and inservice programs for teachers, foresters, park and nature center staff, and youth group leaders.
- PLT is people! It is an international network of students, teachers, parents, community leaders, educational administrators, and representatives from the forest products industry, resource agencies, and conservation groups.
- PLT works in the city and county, whether there is a forest or a single tree.
- PLT helps prepare students to make wise decisions about conservation practices and resource use.

What are the benefits?

Children:

- learn **how** to think, not **what** to think, about our complex environment.
- discover how subjects and skills taught in the classroom relate to the world around them.
- develop skills in creative problem solving, critical thinking, evaluation, and research.
- have fun while learning.

Teachers:

- discover over 175 activities that help teach science, mathematics, language arts, social studies, humanities, and other subjects.
- receive a ready-to-use PLT guide which actively involves students in the learning process.
- find that PLT activities work with a variety of teaching and learning styles.
- participate in a creative, hands-on workshop that helps improve their classroom skills.
- receive a complimentary subscription to PLT's newsletter, the **Branch**, filled with teaching ideas and activities.

What's in the Guide?

- PLT provides ready-made lessons and activities that can be used to supplement **existing** curricula.
- PLT activities are action-oriented and can be used in any order and require little, if anything, in the way of equipment.
- PLT activities can be used with children with special needs.
- PLT was written by classroom teachers with the support and assistance of environmental educators, foresters, and representatives from forest products companies, resource agencies, and conservation groups.

Awards

PLT is nationally recognized as an outstanding environmental education program. PLT and its cosponsors, the American Forest Foundation and the Western Regional Environmental Education Council, have been honored with a number of awards, including:

- The Distinguished Service Award from the North American Association for Environmental Education.
- The Distinguished Service Award from the Conservation Education Association.
- The National Conservation Education Achievement Award from the National Wildlife Federation.
- The Education Award from the Arbor Day Foundation.
- The Conservation Education Award from the California Natural Resources Federation.
- The Educational Sponsorship Award from the National Association for Industry-Education Cooperation.

In addition, President Reagan honored PLT during a private White House ceremony for being one of the nation's exceptional volunteer programs. PLT works!

Background

PLT is a grass roots volunteer program that works in conjunction with local school districts and state agencies. State coordinators and steering committees guide the development of the program and select and train workshop leaders. PLT is administered nationally by the American Forest Institute, a forest products industry trade association dedicated to improving management of the nation's forests.

PLT is cosponsored by the American Forest Foundation (AFF) and the Western Regional Environmental Education Council (WREEC). AFF is a 501(c)(3) charitable education foundation supported by grants from individuals, foundations, and the forest products industry. WREEC is an association of representatives from departments of education and departments of natural resources from 13 western states.

PLT has reached over 80,000 educators and more than seven million students in 40 states and three foreign countries since it was field tested and revised by classroom teachers in 1977. Research and field surveys show PLT to be an effective teaching tool. Feedback from educators insures that PLT will remain a valuable and useful curriculum.

How do I get involved?

You find out about PLT resources and activities at a six-hour workshop held in your area, where you will meet with foresters, resource professionals and other educators. During this workshop, you will:

- Participate in hands-on PLT activities, both indoors and out.
- Learn more about trees and forest ecology from foresters.
- Expand your knowledge and teaching skills.
- Find out how PLT can enliven your curriculum.
- Meet and share ideas, information and resources with other professionals.

At the workshops, you receive the PLT guide free of charge and have the opportunity to plan ways in which the guide can be used in your classroom.

Workshops in your area

To find out about the next PLT workshop in your area, or for more information about PLT, write to:

Project Learning Tree
1619 Massachusetts Avenue, N.W.
Washington, D.C. 20036

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Project WILD

Project WILD is an interdisciplinary, supplementary environmental and conservation education program emphasizing wildlife.

For instructional purposes in Project WILD, wildlife is defined as any non-domesticated animal. Wildlife may be small organisms only visible to people if seen through a microscope, or as large as a great blue whale. Wildlife includes, but is not limited to, insects, spiders, birds, reptiles, fish, amphibians, and mammals, if non-domesticated.

Project WILD's primary audience is teachers of kindergarten through high school students. This does not limit the usefulness of the Project to formal educational settings, however. Volunteers working with young people in pre-school and after-school programs; representatives of private conservation, industry, and other community groups who are interested in providing instructional programs for young people or their teachers; and personnel involved in preparation of future teachers are all among those who effectively use the instructional resources of this program.

Project WILD is based on the premise that young people and their teachers have a vital interest in learning about the earth as home for people and wildlife. The program emphasizes wildlife—because of its intrinsic, ecological, and other values, as well as its importance as a basis for understanding the fragile grounds upon which all life rests. Project WILD is designed to prepare young people for decisions affecting people, wildlife, and their shared home, earth. In the face of pressures of all kinds affecting the quality and sustainability of life on earth as we know it, Project WILD addresses the need for human beings to develop as responsible members of the ecosystem.

The goal of Project WILD is to assist learners of any age in developing awareness, knowledge, skills, and commitment to result in informed decisions, responsible behavior, and constructive actions concerning wildlife and the environment upon which all life depends.

Project WILD is a joint project of the Western Association of Fish and Wildlife Agencies (WAFWA) and the Western Regional Environmental Education Council (WREEC). These two organizations are the primary sponsoring agencies.

Some might say that Project WILD is an excellent set of teaching materials bound in an attractive format. Professional educators could describe these materials as a supplementary, interdisciplinary, educational program directed at providing learning experiences for students in kindergarten through grade twelve.

WILD is these things and more. These descriptions fall short of capturing the essence of the program. Quite simply, Project WILD is people—educators, resource managers, citizen conservationists, and others—doing something together which they believe is important for children, and for the land and its resources, now and for the future.

As with all good teaching materials, Project WILD is concerned with providing information and helping students evaluate choices and thereby make reasonable decisions. In short, our mission is to help youngsters learn **how** to think, not **what** to think.

For further information contact: Dr. Cheryl Charles, Project WILD, Salina Star Route, Boulder, Colorado 80302.

Excerpted and adapted from the *Project WILD Activity Guides*. Copyright © 1983, 1985, 1986 by the Western Regional Environmental Education Council. Printed with permission.

The Conservation Learning Activities for Science and Social Studies Project.

(The Class Project)

Publisher: National Wildlife Federation, 1412 Sixteenth St., N.W., Washington, DC 20036.

Program Objectives:

1. Overall Program Purpose: To help students develop an environmental ethic and to help them use their acquired skills and concepts in taking thoughtful, positive action to protect and enhance the natural environment.
2. Specific Objectives: The materials are designed to:
   a) help students achieve understanding of environmental concepts and skills;
   b) help students develop and practice the skills of observing, measuring, data collecting, classifying, hypothesizing, predicting, making value judgments, communicating, and problem solving;
   c) aid in the development and use of student skills in investigating and solving environmental problems;
   d) involve students in community action projects;
   e) give students experience in observation, classification, data collection, record-keeping, prediction, communication, and decision-making.

Description of Program: There are nine sections in The Class Project. The first section is an introduction and overview. Then there are six content sections which are: Energy Use; Environmental Issues; Forest/Watershed Management; Hazardous Substances; Wetlands; and Wildlife Habitat. There is a unique section entitled, "You Can Make It Happen." This section describes class projects that have been completed by other teachers. The addresses and phone numbers of the teachers are listed, and they have agreed to act as consultants. The last section, entitled "Digging Deeper/Glossary," is a resource bibliography.

Each content area begins with an introduction that provides background information. Then there are four or five activities. Content and process objectives are provided for each activity. Among the suggestions for each content area is a list of community action projects. These can become a classroom's community action project, which is an important goal of The Class Project.

The Class Project activities are designed to be used as supplementary to an existing program. There is not a prescribed order for the content areas or the activities within the areas.

Methods of Instruction: A variety of approaches are used. Methods of instruction used in The Class Project include: surveys, experiments, simulations, discussions, debates, field trips, and library research.

Specific Subject, Grade, Age and Ability Levels: The subjects are interdisciplinary including biology, earth science, chemistry, and physics. There are also parts that include social studies. They may be used in either science or social studies classes. The materials are designed for use in grades 6 through 9, though they could be easily adapted to higher grades.

The Class Project materials will work with a wide range of ability levels.

Materials Produced:

1. The Class Project binder (containing Activities and Poster Packet).

Program Implementation: Workshops are provided by the National Wildlife Federation. Materials are provided through a grant from the National Science Foundation. Names and addresses of teachers who have used The Class Project are provided in the reference section. Nothing more than standard science facilities and equipment are required.

Teacher Preparation: The materials do not require specialized background. Science teachers should feel comfortable with the content areas. There may be some adjustment to new instructional methods such as simulation activities, and incorporating social studies concepts. Background information is provided with each activity.

Financial Requirements: The first 10,000 sets of materials will be distributed free through National Wildlife Federation workshops.

Science and Society Teaching Units

Program Director/Publisher: Douglas A. Roberts, The University of Calgary/The Ontario Institute for Studies in Education, 252 Bloor St. W., Toronto, Ontario, M55 1V6.

Program Objectives:

1. Overall Program Purpose: To provide materials with a curriculum emphasis on science and society.
2. Specific Objectives. The materials are designed to:
   a) introduce an understanding of the relationship between scientific knowledge and the decision making processes used by society in dealing with practical affairs;
   b) teach students that they can use science in certain aspects of their lives;
   c) enable students to discuss the social consequences of a few of the decisions they might make in the future regarding energy consumption, environment, and other problems related to science and society.

From *The American Biology Teacher*, vol. 46, no. 6, September 1984, p. 312. Reprinted by permission.

College/University Programs

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The Environmental Education Philosophy of the New Jersey School of Conservation: A Resident Center for Environmental Field Study

Dr. John J. Kirk
Director and Professor of Environmental Studies
New Jersey School of Conservation
Montclair State College
R.D. -2, Box 272
Branchville, New Jersey 07826

Located on 240 acres of land, in the center of 30,000 acres of state forest and park in the foothills of the Kittatinny Mountains in the northwestern corner of New Jersey is the oldest, college level environmental field center in the United States. It was established on the Memorial Day weekend of 1949, and, since that time, has hosted over a quarter of a million New Jersey students and teachers and many educators from around the world. Annually, over 11,000 school children and their teachers, plus undergraduate and graduate students from various colleges, participate in courses offered at the School of Conservation.

The physical facilities consist of 57 buildings including cabins and lodges which will accommodate 256 students and 40 visiting teachers. There are also permanent resident facilities for the members of the faculty and staff of the School. In addition to the living accommodations, there are 2 dining rooms, a nature center, a library, an auditorium, an infirmary, a lapidary center, an astronomy center, an 1860's log cabin, a colonial woodworking shop and a blacksmith shop housed in a carriage house dating from 1813. A small lake provides opportunities for aquatic study and outdoor recreation activities.

During the academic year, students stay at the School for 2½ days, 4 days, or 5 days, and are involved in educational activities which begin at 9:00 a.m. and terminate between 9:00 p.m. - 10:00 p.m. in the evening. It is a rather intensive program since the short time period must be utilized to the maximum. The age of the participants range from 3rd graders (8 years old) to university students working on graduate degrees. In any given academic year, there will be over 9,000 elementary-secondary school students and 2,000 classroom teachers involved in programs. During the summer months, 10-day graduate courses are offered for teachers and environmental leaders completing advanced degrees at Montclair State College, of which the School of Conservation is a division, or they may be enrolled in master's or doctoral programs at other universities. Also during the summer months, there is a natural science program for children 8 to 14 years of age. The supervisors of these children are college students majoring in the sciences or in the area of elementary or secondary education. There is also a 6-week camp for severely handicapped children, ages 6 to 18, conducted in cooperation with Jersey City State College, a sister institution.

Focusing specifically on environmental education, teachers who attend programs at the School of Conservation are trained to recognize and utilize 4 learning environments for environmental education: the classroom, the school grounds, the community and natural areas. In using the classroom, we recommend subjects be taught with an environmental focus. Reference materials are made available to assist teachers in introducing this focus into their classroom work. With school grounds, we suggest that various modifications be made in the physical arrangement in order that the piece of property which is usually used only for recess and the parking of cars becomes an outdoor laboratory capable of providing educational experiences condusive to the formation of an environmental awareness and sensitivity. During the summer months at the School of Conservation, teachers can enroll in a 10-day course designed to provide the philosophical framework and a technical expertise for modifying school grounds into environmental laboratories. Dr. William Stapp of the University of Michigan pioneered this approach with the Ann Arbor public schools in the State of Michigan in the late 1950's and the early 1960's.

The third learning environment is the community in which the school is located and where the children live. It is amazing to discover how little teachers and students actually KNOW about the community in which they live. At the School of Conservation, teachers are encouraged to do an assessment of those factors in the community that make it a nice place in which to live and, conversely, to review those conditions which detract from a positive living experience. We then strongly recommend that the children and the teachers explore the possibility of utilizing government and the tools of government, combined with concerned individuals in the private sector, to make the necessary modifications in their community in order to provide more of that which is desirable and mitigate the undesirable features. Such experiences broaden the children's understanding of government in a democratic society and tend to encourage them to be active, participating citizens with a vital role to play in the enhancement and the improvement of life in their community. Teachers must point out to the children that, through a combined effort of several local programs and local communities, ultimately, a better way of life can be achieved for all people. Only through such a collective effort will real change ever be achieved.

The fourth learning environment is that of natural areas. Once again, the teachers are advised to focus upon the purpose of such an experience before taking students from the classroom into a natural area. The justification for activities in natural areas, as viewed by the faculty of the School of Conservation, is to help students to discover the role that natural resources play as part of a life support system. At the School of Conservation, we are located in the center of 30,000 acres of forest land. It is, therefore, our primary function to point out to students and to teachers the role that forest lands and woodlands play in our survival. Every activity taught at the School reinforces this concept.

This is the focus of all programs at the New Jersey School of Conservation. Teachers are encouraged to utilize the four learning environments: the classroom, the school grounds, the community and natural areas, and to include the four curriculum areas: Humanities, Social Studies, Outdoor Pursuits and the Natural Sciences in their environmental education programs. We hope that this approach will develop a sensitivity and an awareness in the minds of the students and teachers served and that our philosophical endeavors at the School of Conservation represent a positive contribution to the field of Environmental Education.

Northern Illinois University
Lorado Taft Field Campus

From this rural base, 35 miles west of the university's main campus at DeKalb, Taft Field Campus dispenses one of the most comprehensive and unique conservation, environmental, art and nature education programs in the nation. Its mission is preparing teachers to conduct outdoor education programs and to utilize the world of nature as an instrument for teaching a wide range of studies. Thousands of Illinois school children cooperate in this training at the site and they, too, learn much about nature.

Taft Field Campus is making its own history with a faculty of nine professors, 11 buildings—and a widely-varied terrain that includes ravines, marsh, fields, ponds, river environments, steep cliffs and rock outcrops.

Its story is that of a small, rustic and outdoorsy specialized satellite campus exerting national and international influence far out of proportion to its size.

Its major beneficiaries are the school kids of Illinois, not only for what they learn in classroom field trips to the place, but also for what their future teachers are learning there.

The campus is a leading center for teaching teachers about the natural world, how to convey its secrets to their students and how to improve pupils' grasp of all classroom subjects through outdoor education. No matter what the outdoor teacher education innovation might be, Taft usually has already done it, is doing it or invented it!

Taft's library houses a most complete collection of outdoor education research studies and microfilms on environmental, conservation, outdoor adventure and school camping education. The facility lures graduate students from universities all across the United States and Canada.

Another trendsetter in the Taft program is the master's degree it offers in outdoor education, which makes NIU one of few institutions where such a degree may be obtained. Pursued at both the field and main campuses, the degree attracts students from all over the nation and from many foreign countries.

Taft campus also awards teaching assistantships and partial fellowships in outdoor education. Assistantship recipients reside at Lorado Taft, participate in an "internship"—supervised practical training program and receive a stipend along with room, board and tuition.

The coupling of student teachers and grade schoolers in overnight residency for a better mutual learning experience was not a new concept when it was initiated at Taft Campus in 1953 as a pilot project. But the practice since has been expanded and refined there, perhaps to its ultimate.

That first experiment involved a single overnight stay for a class of NIU University School sixth graders and a group of education majors. Today, thousands of elementary, junior high and senior high school youngsters visit the campus in groups of up to 155 pupils for three- and five-day stays. To many of these children, the "outdoors" referred to the city streets and "nature" meant their front lawns or municipal park before they arrived at Taft.

The residential program benefits teachers-to-be, inservice teachers and grad students with unmatched clinical experience while they are studying. For the youngsters, it provides opportunities to learn in an outdoor environment what they could never absorb from textbooks alone and to interact with their peers and teachers in a manner not possible in their classrooms.

Long ago, educational pathfinders pointed out that in our industrialized society, children needed more first-hand, direct experiences to provide depth and meaning to their classroom experiences. A Taft brochure distributed to schools explains the value of the Taft program:

"Children are active, curious, adventurous and enthusiastic learners in the outdoors. For the first time, many activities make sense to children when they are able to participate in them through first-hand or direct experience. Whether the outdoor experience is used for teaching science, conservation, social studies, language arts or arithmetic, it is a valuable part of the school's instructional program."

The residential programs for children bring the most smiles to the Taft administration's collective face, however. Each year, such programs are conducted for approximately 65 grade schools within a 100-mile radius of the campus, an area that includes Chicago. The preferred group size is 80-100 kids, but up to 140 can be accommodated.

Teachers accompany their classes since they are responsible for part of the instruction and supervision in dormitories and during non-instructional periods. The remainder of both the supervision and instruction are provided by campus personnel, usually senior education majors and graduate students.

Extensive pre-planning goes into these outings, which generally must be booked a year in advance. Campus representatives visit the schools requesting a residential program, or school officials may come to the campus. They discuss themes, supervision, program components, objectives, activities, instructional materials, health and accident insurance, food and lodging arrangements, myriad logistic factors, and the correlation of the experience with the school's curriculum. All facets of the student's day at the campus are considered.

Further information on Taft Campus can be obtained by calling (815) 732-2111 or by writing in care of the facility at Box 299, Oregon, IL 61061.

Excerpted and adapted from "Revival at Eagles' Nest," ***Outdoor Highlights,*** **Illinois Department of Conservation. 14-2, January 20, 1986.**

Bradford Woods
Center for Outdoor Education, Recreation and Camping
Bloomington, Indiana

Bradford Woods is Indiana University's 2,300-acre instructional center for leadership in outdoor education, outdoor recreation, and camping. Generously given by John Bradford, the last of a pioneer Hoosier family, in accordance with his will, the estate is devoted to the welfare of children and to the professional preparation of leaders of youth.

Two man-made lakes on the property are available to Bradford Woods groups for swimming, boating, and fishing. The 100-acre lake provides beach and boating facilities for camp programs, while the smaller lake offers on its shores an excellent setting for day camping.

Bradford Woods is administered by the Department of Recreation and Park Administration in the School of Health, Physical Education and Recreation of Indiana University, with guidance from an advisory committee representing many of the major program constituents. These include the University System, the Riley Memorial Association and school corporations. Developments have been made possible largely through private gifts obtained by Riley Memorial Association. In recent years, over $3.5 million has been raised for capital projects at Bradford Woods.

Bradford Woods provides a laboratory for outdoor programs, workshops, and leadership experience. Year-round opportunities exist for students to gain academic credit and practical experience in the following areas: outdoor education, outdoor recreation, camping administration and leadership, resource management, therapeutic recreation, special education and other areas. Major programs include a full residential summer camping session for children and adults with a wide variety of disabilities, fall and spring school camping/outdoor education programs for elementary and special education children, conferences, seminars and professional development workshops, adventure challenge programs and weekend retreats and gatherings.

The goals of the Bradford Woods program are:

1. To provide an enjoyable learning experience in the outdoors whereby students may reinforce classroom learning, become aware of their environment(s), and understand their relationship to this environment(s) through direct experiences.

2. To provide student teachers, college fieldwork students and intern students with skills and techniques for teaching effectively in the outdoors through practical teaching experiences.

3. To provide classroom teachers with the opportunity to plan and participate in a broad array of educational approaches to teaching/learning about and from the environment with due stress on practical activities and first-hand experiences.

4. To develop methods of evaluation in an effort to determine if the goals and objectives, as stated, are being realized and if they are not, to make changes as deemed necessary.

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University, Bloomington, IN.**

OUTDOOR EDUCATION

FACT SHEET

ERIC: Outdoor Education Resources

Where can I find major unpublished literature dealing with Outdoor Education?

One source is the Educational Resource Information Center (ERIC). ERIC is funded by the National Institute of Education to collect unpublished educational literature which is maintained in a computerized database. The ERIC Clearinghouse on Rural Education and Small Schools (ERIC/CRESS) is one of the 16 clearinghouses in the ERIC system working in this effort. One of the responsibilities of ERIC/CRESS is to collect outdoor education materials. The ERIC database currently includes over 2,193 titles related to outdoor education.

Can I use the ERIC database to determine trends in the literature on Outdoor Education?

The ERIC collection is one indicator of developments in outdoor education, although it should be noted that not all unpublished literature gets into the ERIC database. Not all material submitted and some items do not meet ERIC technical or content criteria.

ERIC/CRESS has been collecting unpublished literature on outdoor education since the first year of the clearinghouse in 1966. Between 1972 and 1982, an average of 158 outdoor education documents have been added to the ERIC database each year.

What kind of educational material will I find in the ERIC database?

The ERIC database was created to serve a broad audience and, consequently, includes a wide variety of materials ranging from program descriptions to very basic teaching guides. A recent search of the database indicates that various kinds of reports make up the largest percentage of outdoor education materials found in ERIC. Examples of report literature include program descriptions, annual reports, feasibility studies, program evaluations, surveys, and research models. The second largest category of outdoor materials is that of guides (e.g. teaching guides, curriculum guides, guidelines, lesson plans, administrator guides, etc.). Speeches and conference papers constitute the third largest category of documents on outdoor education. The remainder of outdoor education materials are scattered among such document types as opinion papers, directories, bibliographies, information analysis papers, conference proceedings, theses, and historical materials. A careful analysis of the materials found in ERIC can be used to indicate research and information needs.

Where can I find ERIC materials on Outdoor Education?

Most colleges and university libraries have ERIC microfiche collections. The *Directory of ERIC Microfiche Collections* indicates the location of each ERIC collection in the U.S. and in foreign countries. Among the tools designed to help you use the ERIC system are *Resources in Education* (RIE) and *Current Index to Journals of Education* (CIJE), monthly indexes to the ERIC database. RIE and CIJE provide abstracts, index terms, and bibliographic information on each document or journal article entered in the database. You are able to conduct a manual search using the indexes. When searches are more complex, a computer search may be conducted, usually for a fee. You can go to your nearest ERIC collection and read an entire document on a microfiche reader. If you decide you want your own paper copy, you may order it from the ERIC Document Reproduction Service (EDRS) located in Arlington, Virginia.

What Outdoor Education and related topics are included in ERIC?

The following list includes some important outdoor related subject areas found in the ERIC collection and the number of outdoor education documents that are mainly about each subject area.

Adventure Education (127)
Camping (655)
Curriculum (465)
Environmental Education (1,037)
Experiential Learning/Education (317)
Field Trips (264)
Handicapped (48)
Hiking/Backpacking (95)
Juvenile Delinquents (24)
Outdoor Activities (24)
Outdoor Nutrition/Food (43)
Plant Identification (45)
Recreational Activities (129)
Risk (30)
Safety Education (93)
Survival Skills (17)
Females (14)

What descriptors should I use when searching ERIC for material pertaining to Outdoor Education?

Using the *Thesaurus of ERIC Descriptors*, the following terms may be used separately or coordinately for documents pertaining to outdoor education.

Adventure Education
Day Camp Programs
Discovery Learning
Experiential Learning
Field Experience Programs
Field Trips
Interdisciplinary Approach
Outdoor Activities
Outdoor Education
Recreation
Resident Camp Programs
Risk
Self Concept
Stress Variables
Summer Programs
Trails

NOTE: To retrieve materials on terms such as Risk, Self Concept, and Stress Variables, coordinate indexing using indepth manual searching or precise computer searching may be called for.

How may I find material written on or about a specific project or approach to Outdoor Education?

A document's indexable information includes proper names, geographic locations, or projects. They can be used to access information.

ERIC® CLEARINGHOUSE ON RURAL EDUCATION and SMALL SCHOOLS

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For example

- Backpacking
- Experiential Education
- Hiking
- Outdoor Biological Instructional Strategies
- Outward Bound
- Project Adventure
- Project DARE
- Project TORCH
- Lorado Taft Field Campus IL

Just how specific can I get when requesting a computer search of the ERIC database?

As a rule, the more specific your search question is, the better your search results will be. For example, you can request a search for using the outdoors for teaching English at the sixth grade level. That is, you can easily narrow a search to: (1) grade level, (2) approach to education (outdoor education), (3) subject matter (English), and (4) document type (curriculm guide or teaching guide). On the other hand, it is possible to search the entire ERIC collection in terms of a single concept (as opposed to multiple concepts). For example, you might want to ask the computer for documents dealing only with elementary education or even simple Grade Six.

Do I have to search the entire ERIC database each time I want information on a specific topic?

No, you may find that your topic has already been searched, you may even find your topic has been the subject of one of the synthesis papers produced by ERIC/CRESS. It is often helpful to check with the Information Specialist for Outdoor Education at ERIC/CRESS to determine if a search of the database is necessary. Each year CRESS produces a limited number of information bulletins, reviews, fact sheets, computer searches, topical annotated bibliographies, and extensive information analysis papers.

How are topics of CRESS products determined in Outdoor Education?

The Information Specialist works with the representative for outdoor education on the CRESS National Advisory Board to assess the educational information needs of individuals involved in outdoor education and to develop products synthesizing needed information. CRESS synthesis products range from very brief topical bibliographies to in-depth information analysis papers. By requesting that your name be included on the CRESS mailing list, you can receive information about these products as they are developed.

If I have material on Outdoor Education which I would like to share, how do I go about submitting it to the ERIC database?

All you need to do is send two of your best copies to the ERIC Clearinghouse on Rural Education and Small Schools. The Information Specialist for Outdoor Education will evaluate your material to determine if it is appropriate for inclusion in the ERIC database. If your material is selected to go into ERIC, you will be contacted and asked to sign a reproduction release. Three to four months later, you will receive a complimentary microfiche copy of your document. The following address should be used to submit material to ERIC/CRESS:

Attention: Information Specialist for
Outdoor Education
ERIC/CRESS
Box 3AP, New Mexico State University
Las Cruces, NM 88003

(505) 646-2623

Other than ERIC, where may I go for additional information in Outdoor Education?

The following list of organizations is a first attempt to provide a directory of outdoor education organizations. Therefore, the list is not inclusive of all organizations involved in outdoor education. Please let us know if your organization would like to be included in any future update.

Safari Club International Conservation Fund
5151 East Broadway, Suite 1680
Tucson, Arizona 85711
CONTACT: Donald J. Brown, Educational Director
Phone: (602) 747-0260

SCICF was founded for and is dedicated to conserving wildlife and educating mankind as to how this conservation may best be accomplished. Its projects include the American Wilderness Leadership School, wildlife research and relief, sponsorship of regional, state and national teacher workshops, and grants to support wildlife management projects.

Institute for Environmental, Camping, and Outdoor Education
Box 807
Daly City, California 94015
CONTACT: Dr. William M. Hammerman, Program Coordinator
Phone: (415) 755-8137

The purpose of the Institute is to sponsor workshops, seminars and conferences related to ECO Education. The program is based upon the premise that a major goal of education is the recognition by people of their interdependence with their environment and with life everywhere, and the development of a culture which maintains that relationship through policies and practices necessary to secure the future of an environment fit for life and fit for living.

Colorado Outdoor Education Center for the Handicapped
P.O. Box 697
Breckenridge, Colorado 80424
CONTACT: Connie Lewis, Program Director
Phone: (303) 453-6422

The Center is a non-profit, Colorado corporation established to respond to the needs of physically, medically, emotionally and developmentally disabled young people and adults through therapeutic wilderness experiences. It seeks to empower disabled people to have more control and independence in their lives and play a greater role in society.

Colorado Outward Bound School
945 Pennsylvania Street
Denver, Colorado 80203-3118
CONTACT: Jerry Golins, Director
Phone: (303) 837-0880

Personal development through outdoor adventures is the mainstay of both the backpacking courses and the whitewater rafting courses offered by the school. It offers year around courses of varying lengths in ski mountaineering, backpacking and whitewater rafting. A free catalog is available.

Lorado Taft Field Campus
Box 299
Oregon, Illinois 61061
CONTACT: Clifford E. Knapp, Faculty Chairman
Phone: (815) 732-2111

The goals of Lorado Taft are to provide undergraduate and graduate students with the knowledge, skills, and attitudes required for effectively using outdoor environments in teaching, and to provide inservice teachers and others with educational responsibilities with the knowledge, skills and attitudes needed for organizing and administering outdoor education and related programs

American Camping Association
Bradford Woods
Martinsville, Indiana 46151-7902
CONTACT Armand B Ball, Executive Vice President
Phone (317) 342-8456

The ACA is a professional, non-profit organization of 5,100 members and 2,400 organized camps It is the only national accrediting body for all types of camps, and the only national certifying body for camp directors It publishes *Camping Magazine* and *Parents Guide to Accredited Camps*, as well as numerous books and materials in the field of camping and outdoor education

Bradford Woods Indiana University Outdoor Education, Recreation and Camping Center
5040 State Road 67 North
Martinsville, Indiana 46151
CONTACT Gary M Robb, Director
Phone (317) 342-2915

The goals of the outdoor education programs at Bradford Woods are to provide students with the opportunity for experiential learning and developing a sense of stewardship for the natural environment, as well as promoting the development of academic, social and interpersonal skills

Outdoor Education for the Handicapped Project
University of Kentucky
110 Maxwelton Court
Lexington, Kentucky 40506-0347
CONTACT Anne Cassidy
Phone (606) 257-1721

The Project provides technical assistance to special educators, parents of handicapped children, and park and resource management personnel on outdoor education program development for all handicapped children and youth It has developed various instructional materials and resources

Minnesota Outward Bound School
P O Box 250
Long Lake, Minnesota 55356
CONTACT Laura Kuhn
Phone (612) 473-5476

Minnesota Outward Bound School is a wilderness adventure program that promotes self-discovery and team building through a series of wilderness challenges Its purpose is to promote the development of leadership, self-confidence, and responsibility of one's own actions

Missouri Department of Conservation - Conservation Education Unit
P O Box 180
Jefferson City, Missouri 65102
CONTACT Al Palladino, Assistant Superintendent of Conservation Education
Phone (314) 751-4115

Missouri Department of Conservation - Outdoor Skills Education
P O Box 180
Jefferson City, Missouri 65102
CONTACT F.E. "Bud" Eyman
Phone (314) 751-4115

The outdoor skills unit is dedicated to the development of an outdoor citizenry that is safe, knowledgeable and responsible

New York State Department of Environmental Conservation
Division of Environmental Educational Services
Room 509
50 Wolf Road
Albany, New York, 12233
CONTACT Robert Budliger, Director
Phone (518) 457-3720

The Department provides environmental education services throughout New York State It publishes *The Conservationist*, *The NYS Environment*, and the *Environmental Notice Bulletin*. It operates three environmental education centers and also operates summer environmental education camps for youth ages 12-17

Hillside Outdoor Education Center
Gage Road
Brewster, New York 10509
CONTACT Bonnie Sommer, Director
Phone (914) 279-2996

The Center is an educational facility where groups may come for a day, overnight, or for a week-long or weekend stay It is situated on a 50 acre wooded hillside on which are hiking trails and many teaching stations

Green Chimneys Farm
Putnam Lake Road
Brewster, New York 10509
CONTACT William Zangle, Director
Phone (914) 279-2996

The farm includes a stable, teaching barn, solar greenhouse, gardens and self-guided nature trail, as well as an exhibit of farm machinery In addition to the crops, a variety of livestock is raised on the farm Day visits and special programs are offered to the general public

Tifft Farm Nature Preserve
1200 Fuhrmann Boulevard
Buffalo, New York 14203
CONTACT Robert A Martin, Administrator of Education
Phone (716) 896-5200 Ext 249

The goals of the Preserve are 1) environmental and outdoor education, 2) protection of the 264-acre preserve and its flora and fauna, and 3) passive recreation The staff leads field trips and offers several special programs

North Carolina Outward Bound School
P O Box 817
Morganton, North Carolina 28655
CONTACT Barry Rosen, Director of Marketing and Admissions
Phone (704) 437-6112

The School is a non-profit organization addressing the educational development of the total human being by conducting courses of a physically and mentally challenging nature in remote wilderness areas. Course areas are the Southern Appalachian Mountains and the Florida Everglades.

Outdoor Education Institute
Department of Health and Physical Education
Texas A&M University
College Station, Texas 77843
CONTACT: Dr. Mildred (Mickey) Little
Phone: (409) 845-3458

The Institute enables TAMU to consolidate its efforts in an interdisciplinary outdoor education program. Its primary objective is to assist educators in the development and execution of programs designed to develop skills in various outdoor adventure activities.

Dallas Safari Club
8585 Stemmons
Twin Towers South, Suite 770
Dallas, Texas 75247
CONTACT: John M. Fortner, Executive Director
Phone: (214) 630-1453

The most important achievements of the Dallas Safari Club include the formation of the Dallas Ecological Foundation and the effective distribution of more than $35,000 to significant outdoor education and wildlife conservation projects. The Club's concern for these vital issues continues to manifest itself in its expanding programs.

Woodswomen
2550 Phillsbury Ave. S.
Minneapolis MN 55404
CONTACT: Judith Niemi, Project Director
Phone: (612) 870-8291

Provides adult women a chance to learn outdoor skills and to participate in confidence-building experiences. The core of the program is guiding and outfitting trips--canoeing, bike touring, backpacking and climbing, horsepacking, skiing, and trips with children. The style of leadership emphasized includes safety, group responsibility and decision-making in learning situations that are non-competitive and fun.

New York State Outdoor Education Association
196 Morton Avenue
Albany, NY 12202
CONTACT: George Steele, Vice President for Public Relations
Phone: (518) 472-9028

An organization of professionals dedicated to the methods of teaching through first-hand experience in the out-of-doors. Membership includes administrators, classroom teachers, museum and nature center personnel, environmental scientists, youth leaders, and others who have a love of the outdoors. Services include an annual fall conference, *The Outdoor Communicator* (a leading journal in the fields of outdoor and environmental education), regional workshops and professional assistance and resource materials for outdoor education.

Prepared by: Elaine Roanhorse Benally, Information Specialist
Deborah S. Dyson, Staff Writer
ERIC/CRESS
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The National Institute of Education

Additional associations concerned with Outdoor/Environmental Education:

The Council on Outdoor Education
American Alliance for Health, Physical Education, Recreation and Dance
1900 Association Drive
Reston, VA 22091

National Recreation and Parks Association
3101 Park Center Dr. 12th Floor
Alexandria, VA 22302

Alliance for Environmental Education
PO Box 1040
3421 M Street, NW
Washington, DC 20007

American Nature Study Society
John A. Gustafson, Treasurer
R @ D
Homer, NY 13071

Association for Experiential Education
Box 249-C4
Boulder, CO 80309

National Science Teachers Asssociation
1742 Connecticut Ave, NW
Washington, DC 20009

Other potential resources for information, technical assistance or materials:

Government Agencies:

- U.S. Geological Survey
- U.S. Fish and Wildlife Service
- Bureau of Land Management
- Forest Service
- Park Service
- Bureau of Natural Resources
- State Departments of Fish and Game
- State Departments of Education
- County Extension Service

Non profit organizations:

- Nature Conservancy
- National Wildlife Federation
- National Audubon Society
- American Forest Institute
- Conservation Education Association
- Conservation Foundation
- National Association of Conservation Districts
- The Wilderness Society

Others:

- School and public libraries
- Rock and mineral clubs, etc.